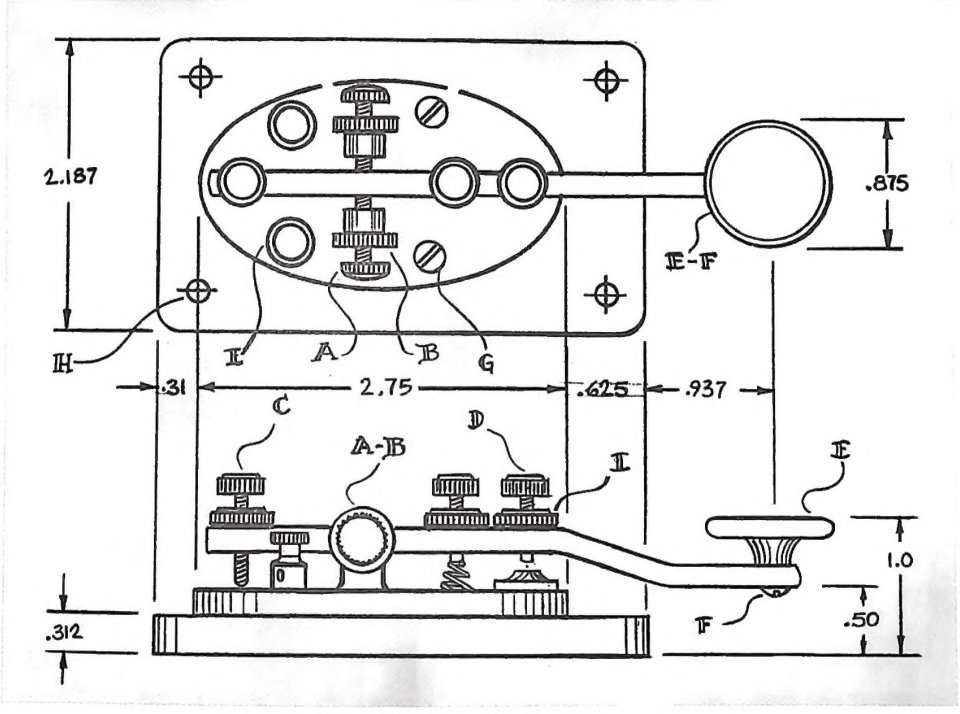
THE CODE BOOK:
Morse Code Instruction Manual

THE PHILOSOPHY AND PSYCHOLOGY OF ACQUIRING THE SKILL OF INTERNATIONAL MORSE CODE

"a quick and easy program for all ages and license classes"



with special emphasis on guidance and inspiration for

"students experiencing difficulties"

revised and expanded

Second Edition

by ROBERT W. BETTS, N1KPR

Dedication

It is with great appreciation and gratitude that I offer this dedication: To Maryann for her publishing and editing expertise and commitment to this project and Stacy who somehow managed to get through all this with us. To all those unnamed Professionals whose formally presented materials and informal words of wisdom and encouragement fueled this work. And finally, not the least of whom, to the dozens of Hams; the experienced, sharing their wisdom and to the anxious, exuberant, tireless students and upgrade candidates desirous of guidance and direction ... an inspiration all.

THE CODE BOOK:

Morse Code Instruction Manual

The philosophy and psychology of
acquiring the skill of International Morse Code

♦ LEARNING THE CODE ♦

♦ IMPROVING PROFICIENCY FOR UPGRADES ♦

♦ REFRESHER COURSE ♦

For Students of
International Morse Code for Amateur Radio

Second Edition
revised and expanded

Researched, Compiled and Written by
Robert W. Betts, N1KPR

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July 01, 1995 Robert W. Betts

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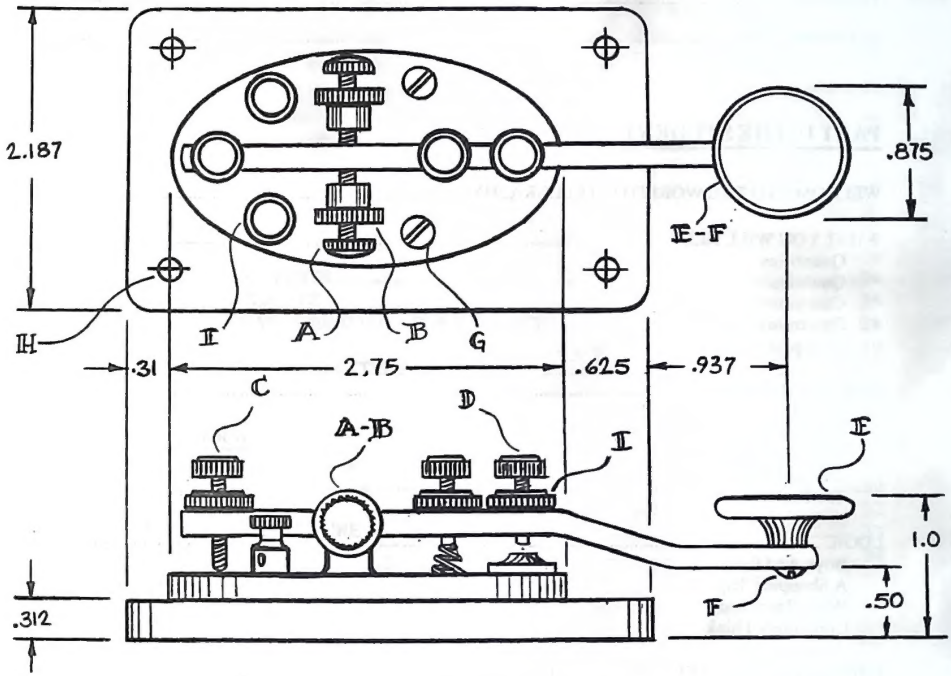

Engineers and Makers
R. W. Betts & Co.
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About The Second Edition

It is with great pleasure that I release this new and expanded second edition of THE CODE BOOK: *MORSE CODE INSTRUCTION MANUAL.* Its publication has been long overdue. Over the years, while teaching Morse Code, I have realized tremendous satisfaction in helping individuals desirous of becoming Hams achieve their goals, as well as assisting others in upgrading their license class. To me, this is probably the most important aspect of the hobby. I can remember exactly what I went through in studying for my Novice exam, not to mention all the subsequent upgrade tests. Over the years, I have seen too much needless discouragement and frustration on the part of the student due to poorly designed instruction courses. Please read the *Preface, Introduction* and *Forward* to fully understand some of my observations. You may "see yourself" in some of the situations I describe. You are not alone! Just about every one of the more than 600,000 presently licensed Hams in this country (and many more, previously) have had some sort of difficulty achieving their goals. Just about all the problems are recognized by code instructors since they have seen them over and over again. Many students think that they are unique; that they are the only one experiencing a particular problem. Not so. I'll say it again: *you are not alone!!!*

Be sure you have read and fully understand the first half of the book. Mental conditioning and your attitudes toward your goals are of the utmost importance.

Being very involved in this aspect of the hobby, I would like to hear from you. Tell me about the obstacles; tell me about your successes. I invite comments and suggestions concerning this manual and the study course.

When writing to me about a question you might have, please be sure to include a stamped, self-addressed business-size (No. 10) envelope. We get quite a bit of mail and couldn't possibly cover postage for all the replies. As for the book, the price is at the absolute minimum. The costs for publishing, advertising, postage, etc. are going up constantly. All things considered, this is just about a nonprofit operation. Our basic reward is helping others within the Amateur Radio community which has been so good to us in the past. We are just trying to give some of it back to the fraternity.

During the short period of time since the original publication, many individuals have offered their solicited and unsolicited comments and suggestions for "THE MANUAL." This input has come from every conceivable direction: volunteer examiners, instructors, upgrade candidates and entry level students. Interestingly, some of the most useful and objective information has come from the students.

It would seem that some experienced Hams and the more-seasoned Cadre have lost a bit of their objectivity about "learning" to become a Ham. This is only natural; it's difficult to remember what it was like being "on the outside looking in" when you have been "inside" for so long. However, it is very refreshing to see so many capable elders pitching-in to help others. These accomplished Hams are learning and relearning the hurdles and obstacles which can be pushed aside much easier with the help of someone who has "been there." Likewise, they, too, are students. And the students are teachers.

Suggestions for the requested, additional study material usually came in the form of questions. It became quite apparent, in short time, that many of the same questions were being asked by the individual students. Additionally, their concerns about test sessions and exams seemed to share a similar theme. It was the gathering and organizing of these questions and answers – concerns and reassurances – that created this edition. This additional study material is presented here in an effort toward making this course of study as complete as possible.

The purpose of the added study material in this second edition is to make the course more comprehensive, particularly to aid those individuals who may be experiencing a little more difficulty in completing the course. Some of the topics added are; Additional STUDY HINTS; to make more efficient and effective use of your study time, aid in comprehension, and speed-up progress; TEST TAKING TIPS; things to be prepared for and things to listen for at your test session. Included are "tip-off" prompts, information warning signs, copy techniques, finding answer sheet fill-ins in the copy, and how you can pass with one minute of perfect copy. Also included are charts and tables to assist you during study and for use as future reference.

Please feel free to drop me a note with any comments, suggestions, or questions. Let me know how you're doing. Good luck in your studies and exams.

73 DE
Bob, N1KPR
Shelton, CT, U.S.A.

Preface

This Manual contains a programmed course of study for the student of the International Morse Code. Although originally developed for Amateur Radio, it can be utilized in a course of instruction for Professional or Commercial Telegraphy. Its format is designed for use by: (a) entry-level students, who may or may not already know the code; (b) operators desirous of increasing their code proficiency toward a license upgrade; (c) individuals who originally learned the code by one of the older or antiquated methods, which, by their very nature, created mental blocks and learning barriers; or (d) telegraphers who seek an effective refresher course.

This Manual is not intended to stand alone as a study course. That is to say, supplemental materials and complementary equipment are required to effect the total program. These materials come in the form of homemade and prerecorded audio tapes. The equipment can vary at the option of the student and may be dictated by the practicality of his or her own personal situation, but might include some form of computer program, a code-generating machine, a telegraph key and code-practice oscillator or keyer. A very desirable resource would be in the person of an experienced telegraph or CW code operator.

The objectives of this book are twofold: (1) to prepare the student in attitude and put in perspective the total picture of the processes involved in learning this skill, and (2) to organize and present the actual study material in a logical and orderly form, providing encouragement, guidance, inspiration and allowing for recreational code practice and other diversions to avoid mental saturation.

By far, the greatest single factor in failing to achieve a desired goal by the student is disappointment or discouragement. It is the author's intention to create an atmosphere of enthusiasm and to continue encouragement throughout the course, particularly during the more involved steps where many students have previously failed and quit. This book was designed with "human nature" in mind, and, in a general way, attempts to deal with it as the course progresses.

Forward

The research on this project began three years before I actually sat down to write this book. It was a labor of necessity and of passion and compassion; the passion of my love for this old art form and the compassion for my fellow and "would-be" Hams. I had become quite involved in this project, sometimes to the point of almost becoming obsessive and compulsive about its completeness. Probably due to the fact that just about every course I reviewed seemed lacking in some respect. It became apparent that some of these "holes" could be responsible for the failings of some of the students. I collected as much data as my sources and resources could supply. I studied the methods of the old land-line operators, such as those used for the railroad, Western Union, Postal Telegraph and various government agencies. I read all the Military Signal Corps material I could find. I studied, with particular interest, many of the commercial courses available – past and present.

Some of the areas of research for the subject matter were from publications of:

EARLY RAILROAD COMMUNICATIONS • VARIOUS TELEGRAM SERVICES
GOVERNMENT AGENCIES • MILITARY SIGNAL CORPS • ATLANTIC CABLE SYSTEMS
STEAMSHIP RADIO PRACTICE • AMERICAN RADIO RELAY LEAGUE
COMMERCIAL WIRELESS SERVICES • VARIOUS INDEPENDENT COMMERCIAL COURSES & SCHOOLS

All of this data was assembled and presented to a cross section of professionals and experts in the field for evaluation, comments, and suggestions. It was with the help of these individuals, that this course of study and the lessons it contains, was formulated and assembled.

It was my intention to gather information, guidance and opinions on how we think and how the human brain works from many very broad and diverse backgrounds and disciplines of specialization so that all points-of-view might be represented. The expertise in these areas comes from the following individuals:

ENGINEERS • PSYCHOLOGISTS • PHYSICISTS • PSYCHIATRISTS • ARTISTS • SOCIOLOGISTS
DOCTORS OF PHILOSOPHY • MUSICIANS • TEACHERS • VOLUNTEER EXAMINERS (VEs)

and last, but certainly not least, the experienced Hams; the ladies and gentlemen who have "been there"; the folks of wisdom, who have learned about it the right way: by doing, by operating, by teaching and by sharing the "good" and "bad" learning methods and habits of this skill.

Good Friends To Hams

Since there was no funding for this project, the advice and assistance from these Hams and "friends-of-Hams" was "for the benefit of the fraternity" and given in "good faith," that they might remain anonymous. I'm sure the fact that most of these people are Hams, themselves, didn't hurt the cause. It is with extreme gratitude to these experts and professionals that I publish this work. Their unselfish cooperation is greatly appreciated.

[None of the herein mentioned organizations or agencies have enlisted, endorsed or otherwise sponsored this work and are mentioned merely as bibliographical references.]

Introduction

The genesis of this book was a personal inspiration. The idea hit me after seeing person after person battle with the Morse Code. I listened to stories of struggle, depression and failure. Many people who would otherwise be on-the-air today, have given up in sheer desperation. As a Volunteer Examiner at our local test sessions, I, too, was unhappy to see these license candidates and upgrade applicants enter the testing room bright-eyed, inspired and eager, only to have to tell some percentage of them that they didn't "pass" their code exam, and then watch their faces express disappointment as they amble out of the door. Some would return at the next session; others would give-up in complete frustration never to get their upgrade – or worse, never to become a licensed Radio Amateur. To me, it seemed like such a waste, not only of time, talent and resources, but of pride in achievement, self respect and the potential fun that may otherwise lie ahead. The excitement of upgrading to the next class with all its attendant privileges or the thrill of finally becoming a Ham and seeing the door of unlimited communication possibilities open are all abandoned because of an incorrect study program, poor learning habits or improper guidance.

I firmly believe that most, if not all, of these traps can be avoided with the proper study program. The course of study in this book is based on knowing about "us," the students, before plunging head first into the Code.

For example: When, as an infant, you were hungry but hadn't yet acquired the skill of feeding yourself, you had to be carefully spoon fed, in measured, controlled amounts. It also was determined which types of food you should eat. As you gained eating skills and learned from those more experienced, you were allowed to feed yourself. You knew how and what to eat. Your brain and body in mental and physical harmony had become increasingly proficient to the point where you didn't have to be supervised or coached anymore. You had learned a skill and acquired some early wisdom. This may sound like a silly comparison, but while stretching an example, it is actually quite appropriate.

With the exception of good old-fashioned stubbornness, I probably did everything wrong when learning the Code. Well, we didn't know any better. We were told to "learn" the code, get used to it and get good at it.

Learning Morse Code should be no different than learning any other skill. Certainly easier than learning to eat properly!

So, make up your mind; you are going to learn the skill of the Morse Code!

Good Luck, 73 DE Bob, N1KPR.

Part I: The Student

Welcome To The World of Telegraphy

If you are just beginning to learn Morse Code, welcome to the world of Telegraphy. It is fun, exciting, rewarding, and to many people, relaxing. If you are already proficient at some code speed and would like to upgrade your license class . . . welcome back.

With this course, we will take you step-by-step through the total learning experience. It is going to be different from the way you learned in school. It won't be like learning math or physics because you will be learning a skill – not an academic subject. We will revitalize that infrequently used talent of learning and using skills. We will bring your instincts back to the surface. You will once again be in-touch with the basic qualities that first showed you how to communicate as a child; when you learned to hear, understand and speak words.

If you have thought about learning the code in the past, but were hesitant because you thought it might be a little too difficult or too time consuming or just not for you; well, put that all aside. You are not unusual; many people feel that they just "won't get it." But you will! Your part will be easy. All you have to do is read and understand everything here, believe what you read, and practice it as though this book was written for you. You'll have to be honest with yourself and, of course, you'll have to put some time into the effort. Imagine that you are the only student in this code course and as the instructor, I am right there, in the room, with you. We're going to do just fine.

We are going to have fun. Think of this whole project as fun. If it becomes "work" for you, we are going to make little or no progress. Make up your mind that you are going to learn a new language. Unlike your present language, which is made up of hundreds of sounds or syllables, you are going to learn just two syllables: dit and dah. Every letter, number and punctuation will be composed of one or both of these two sounds, alone or in combination. Make it very clear to yourself that there are no dots and dashes – just sounds: dits and dahs. Whether you know the code or not, no matter how you were taught or what you previously thought about Morse Code; forget it. Try to put any preconceived ideas or past experiences out of your mind.

This is going to be easier that you thought. We are going to do it right; step by step. There will be times when you may begin to get a little discouraged. Together, we'll pull you out of that. Don't ever think that this is going to be a big undertaking; it's not. Don't think that this is somehow "not for you"; it's for anyone who wants it. Read this book carefully; digest every sentence. When you arrive at the actual code course, stop. Think about all that you have read. Do you understand everything? Is it all clear to you? Does it all make sense? If not, review the material that isn't totally clear. If you feel comfortable with everything you have read, start the course, and good luck.

What You Will Need

QUANTITIES

What will you need to learn the Morse Code and become proficient in sending and receiving in the least amount of time with the least amount of effort? Well, there are certain types of practice tapes available from a number of sources; there are some excellent interactive computer tutorial programs available also . . . either or both of which will fit into your custom-tailored program.

Having a "Ham" friend who is good with code and CW, and can donate a little time to your cause, will also be a great help.

If you have a telegraph key, code-practice oscillator or keyer and tape recorder, you can have some fun making your own tapes – at first by an experienced code operator, then, later, by you.

If you currently hold an Amateur radio license which allows you to go on one of the HF bands and operate CW, then please do so. It's great code practice!

QUALITIES

But there are three things that you can't buy, three things that are crucial to your learning, three things that you must have to succeed in this program.

What are these three important things? Well, they are really the easy part, they are free and you get to supply them. They are:

Commitment • Determination • Discipline

Let's discuss these three qualities so that we can lay a proper and concrete foundation to build on. Remember, no matter how expensive the tools or the quality of materials, no matter how elaborate and elegant the plans, the structure will crumble and fall without the proper underlying support: *the foundation*. These basic qualities are the foundational materials.

As you read about these three qualities, think about them and how they apply to you. Think about how you already have used them and how they have worked for you. Think about how they are going to be exercised; how they are going to grow stronger; how they are going to take you from the beginning of this course straight through to your goal.

COMMITMENT

This is a stepping stone – the first step. Commitment is half the job. Once you commit to do it, you are already half-way there. You must decide, in your mind, that you want to start learning, study by a schedule and achieve the objective: to be proficient at the code speed goal of your choice. You must be totally committed with a desire so strong that you would never be able to relax if you slack-off on your schedule. You should be so committed to this effort that you'll feel guilty because you cheated yourself by being a little lazy during any one session. Maybe, you rationalized that you were ahead of schedule. Or possibly, for any other reason, you could skip this particular session.

What are some of the things that you have been totally committed to accomplishing? I'm sure there are many. Where have you first experienced total commitment? Maybe in school; sports, a hobby? When and for what was the last time you felt totally committed to a project? Learning Morse Code is no different than any other endeavor. The code can be learned by anyone, it's yours for free . . . if you want it . . . all you have to do is take it!

DETERMINATION

Just as your commitment got you to take the first step, your determination will keep you going. This may be the toughest part of your program. Determination is not "willpower." Willpower can go from an attitude to an emotion. It is a quality of convenience. You can rationalize yourself into and out-of willpower. Determination, however, is when you are comfortable with the thoughts and feelings of your "drive" to go from start to finish, despite any *inconvenience*. Just like the Friday afternoon, leaving school or work, there is no question that you are going from Point A to Point B: you know you are going home. You may run into obstacles. Just as if you are traveling home and run into some slow traffic. It gets worse; the traffic gets very heavy – an *inconvenience,* to say the least. Your trip from A to B will be temporarily interrupted or disturbed and take somewhat longer. You could stop somewhere, maybe at a friend's house, and wait for a while, or you could go shopping and kill some time; but you don't. Why? Because you want to go home. That *is* what you *want* to do. You know that you *are* going home, inconvenienced or not. And you *will* get home; maybe later, but you *will* get there – you are determined – you *know* what you are going to do!

Determination is a total condition, a long-term state of mind. It doesn't come from rationalizing or justifying an inconvenience for the sake of achieving a goal. It comes from the most sincere, the most honest desire to attain something; to get somewhere. It is an intimate understanding between your rational conscious thoughts and your innermost feelings.

DISCIPLINE

This one is easier than you might think. Many people start out thinking that commitment and determination are going to be easy but are a little concerned about their own "self discipline." It's really simple. If you haven't already, you can find a little switch in your head. The "on" position of the switch is labeled " 'I' control 'ME'." Remember: *YOU* can decide what *YOU* want to do. No one can force you to learn the code, just as no one can make you think a certain way. Don't confuse discipline with stubbornness. Stubbornness is usually an emotion. Discipline is a rational, logical tempering of our thoughts. Remember: attitudes control emotions.

You are a person, an individual; you are different from anyone else: past, present or future. You are the smartest, most intelligent person you know. Does that sound foolish? You are probably not a Rhodes scholar or have never been awarded the Pulitzer or Nobel prize, right? But do you think any of these intelligent, scholarly people could learn the code faster than you? Probably not. They would have to work at it just like you. Remember, code proficiency is an *acquired* SKILL. It is not a measure of intelligence, education or how clever you are. For the most part, skills are developed by eye, ear, hand and brain coordination. Skills are not measured by the number of books you read or by scholastic test grades. A "C" student can learn the code just the same as an "A+" student. It is SKILL – not intelligence! People who are achievers, people who get to their goals, have a secret: "If I try, I can do it." That's why industry has its leaders, sports has its heroes, politics has its statesmen and that's why people get to the top of mountains; if I try, I can do it.

For all the reasons that make you different than anyone else – there are an equal number of reasons that make you the same as everyone else. Just about every code student runs into some kind of problem. Chances are very good that somewhere along the way you may hit a stumbling block or two. That's good. You are quite normal. And it will be a good exercise and great learning experience for you to conquer it. It will fortify your self discipline and add to your confidence. Sometimes the problem won't be with learning the code, per se, but rather with some of the more abstract areas of this project. Possibly with discipline, maybe with commitment, or even some form of mental block. When you encounter a difficulty, determine just what it is, analyze it, define it, and then reread that area of this course which pertains to it. Make all the positive moves necessary to scale the obstacle.

So you see: we are all different as people, but we share many similar qualities. Humans are achievers. We seek new and more difficult goals. We continue to break records. We continue to advance. That's what keeps us human – that's what keeps us going. That's also why Amateur Radio has incentive licensing: "I control me; if I try, I can do it"; *YOU* can do it!

Our Two Brains

EVOLUTION

Human beings, after many millions of years, have evolved with highly developed brains. This development, peculiar only to the human race, allows us to reason, interpret and analyze information – then make decisions based on these data. We can also create, envision and formulate ideas and thoughts. Despite all this selective "mental control" that we have over ourselves, and sometimes, in spite of all this intelligence, we manage to survive. We perpetuate our cultures and societies because we can temper our thoughts and actions with wisdom and instinct. Wisdom is the ability to remember and learn from our experiences and apply that to present situations. *Man is the only animal that requires wisdom to protect him from his intelligence.* Our instincts have protected us from becoming extinct! Even after thousands of centuries of mental development, our conscious thoughts cannot always suppress our instincts. The primal instincts were there long before our brains began to develop. They have evolved with us and may have been honed and polished somewhat; however, they are always there. OUR INSTINCTS CANNOT BE IGNORED.

INSTINCTS AND SKILL

Just as education feeds intelligence and intelligence supports education, so too, do skills feed our instincts and our instincts fortify our skills. While some of our basic instincts are suppressed by our temperament of our intellect, they are always there. The more we sharpen our various skills, the more we rely on our instincts. The more we listen to our instincts, the more we polish our skills. Some instincts are basic, like sheltering, gathering, protecting, eating, and communicating. Some instincts are specific and manifest themselves in the form of some particular type of talent. Different people are genetically disposed to different talents. That's why we have mathematicians, artists, doctors and poets. You may not have the genetic talents of an engineer or musician, but everyone has the basic instinctive ability to communicate. It's "in our blood", it's a basic, primal instinct. By listening to that instinct, we can refine it. Since it is a basic instinct and not a specific one; we all can develop it more or less equally. Yes, some individuals will progress faster than others, but we all have the same opportunity for development. Personal communication comes in many forms; for our purposes we'll just consider hearing and speaking. You learned your first language without knowing it. You instinctively learned to listen and talk. You can learn another one with just a little effort. *This new language is the Morse Code.*

HOW WE THINK

The human brain is a very complex organ. Scientists have only a very basic understanding of how and why it works. For the purpose of learning the code or increasing our code proficiency, we only have to contend with some of the very fundamental principles of its structure and operation.

One large portion of the brain is known as the main lobe. This major part is divided into two sections called the left and right hemispheres. It is the dominance of one section over the other that determines the way we think, perceive and visualize things. Our own personal perception of different things is sometimes referred to as "the mind's eye." We are all different and our point-of-view of any one object or subject will most likely differ from that of anyone else's. These perception traits will help or hinder our progress with code proficiency.

THE LEFT BRAIN

Scientists, mathematicians, physicists and engineers are generally left-brain dominant. That is to say, their thought processes must be logical, analytical, orderly and objective. They get answers to questions by combining all the facts – bits and pieces of information – and when all the data is mentally put in its proper prospective and place, they deduce an answer. This logical thinking is called **OBJECTIVE** or **DEDUCTIVE THINKING**. All data must be consciously "translated." TRANSLATION REQUIRES A LOT OF MENTAL PROCESSING AND MANIPULATION – IT IS WORK.

THE RIGHT BRAIN

Artists, poets, musicians and sculptors are usually right-brain dominant. They tend to see things in the abstract. Shapes, colors and sounds are all very subjective. Outside stimuli act upon these individuals and then an answer or solution is formed. This is called **SUBJECTIVE** or **INDUCTIVE THINKING**. Answers to questions are *instinctively* induced. INSTINCT COMES NATURALLY IF YOU LEAVE YOURSELF OPEN – IT IS FUN.

There are two basic types of people who achieve their desired goal speed with the Morse Code: those who really *work* hard at it and those who seem to learn it *naturally*, easily. Think about the left and right brain functions – understand how they work and how the right brain is going to *make* you learn the code, while you are having fun.

Logic

BOYS AND GIRLS

Some psychologists maintain that there is a basic gender separation in the way males and females think. They believe that men think objectively or deductively and women subjectively or inductively. Still, others feel that there is no relationship between gender and the thought process. In either case, different *people* think differently. In that regard, it is true that people are different; not just because we are boys or girls, male or female, young or elderly, doctors, carpenters, engineers, musicians, secretaries, students, truck drivers, and so on; it's because we do not all think alike. Individuals, by definition, are individual. However, regardless of our opinions, attitudes, and education, there are many qualities which make us, as humans, all quite similar.

A SHOPPING TRIP

An illustration of some of this philosophy is the old example of the husband and wife going shopping for clothes to wear to a formal social affair.

The husband goes to the men's shop with the intention of buying what he wants. He needs a new suit and tie for the occasion. He knows there are several colors and combinations that complement his appearance. He has many options, but decides that it would be best to dress conservatively. He knows he looks pretty good in a black suit with a solid, blue tie. He has decided and that is what he is going to the store to buy. At the store, the salesman points out a variety of colors for him to chose. He also makes some suggestions. The husband tells the salesman that he already knows what he wants. What he wants is exactly what he buys.

The wife goes casually strolling down Main Street while window shopping. She glances through the window of one shop, then another and another as she continues her walk through town. Occasionally she pauses and looks at a particular outfit. She drifts in and out of some of the stores. She chats with the salespeople. They offer many suggestions about what to wear to this type of affair; some consistent; some contradictory – she listens without commitment. Suddenly, an outfit seems to jump-out at her. It has really caught her eye; it's a blue gown with a cut and shape that is very pleasing to her. She buys it.

WHAT HAPPENED?

The man knew what he wanted beforehand; he knew it was a formal affair and that the best thing for him to do was to get outfitted in brand-new formal attire. He made a judgement, based on the type of affair it was going to be, and decided that it would be a conservative outfit. He went out and got it. He knew he had an errand to run. It was a chore that had to be done and he did it. This was a little like work; dutifully he completed his task.

The woman, on the other hand, had fun with the whole thing. She made an experience out of it. She went out with no preconceived idea of what she was going to buy. She let the sights of all the outfits play upon her eyes. She listened to the opinions of others. She let all the options weigh upon her subjective mind and made a decision based on what appeared to be the right thing.

Once again, the author does not necessarily subscribe to the above example of gendered thinking. If it were true, women would learn the code faster than men. However, it is a good illustration of the relationship between the objective and subjective thought processes.

SO . . . What does all this have to do with learning the Morse Code? It is simply an example, a picture if you will, of the different ways we think. If you are going to become proficient at the code, whether for on-air use or upgrading your license class, you'll have to learn how to think subjectively. This is not something that you have to make plans for, it should never be work and you must not make up your mind or prejudge anything along the way. Have fun with the code. Let it play with you. You are only going to learn it once – enjoy the experience.

COMPUTERS THINK

The human brain can be thought of as a carbon-based computer. It deals with analog realities. You do not have to examine a flower to know that it-is-a-flower: the smell, colors, shape and general composition cause your brain to INSTINCTIVELY know that it-is-a-flower. Conversely, a silicon-based computer, like the PC that you use, would require significant amounts of data input in order to decide if it meets the requirements of a flower; it must do an enormous amount of TRANSLATING. Remember, that you, the ANALOG computer can see, hear, touch, taste and smell things and without any conscious effort, you probably will automatically know what it is. You seldom (with the exception of some things that are strange or unusual to you) will have to analyze anything. When you see a school bus, you recognize it immediately as a school bus. Just imagine what you would have to tell a machine computer to look for in order to analyze an object to determine if it is a school bus or not!

Thinking About The Morse Code

HOW WE USED TO STUDY

For the last one and a half centuries, since before that first great historical message was sent by Samuel Morse and Alfred Vail on May 24, 1844 ("What Hath God Wrought"!), the Morse Code and the International (Continental) Code has often been taught like it was an academic subject; as though all students were left-brain dominant. The code student was told that a dot and a dash stood for the letter "A" and that a dash and a dot meant "N." Now, imagine what the student goes through when he hears dit-dah. First he hears the two sounds, then he must remember that the dit was first, followed by a dah, then he must lookup in his mind's eye the picture of a dot and a dash, then he must recall that those two elements in that order translate to the letter "A." He then may even double check himself to be sure it wasn't the reverse: the letter "N."

BRAIN SWITCHING

Modern thinking tells us that the right brain could have done the job described above in a fraction of the time without any conscious effort on the part of the student. If the student was never taught dots and dashes but rather sounds; didah . . . dahdit . . . didah . . . dahdit, along with the corresponding letters, he would have instinctively copied correctly.

There is no need or practical reason to learn the code objectively or by deductive logic. It takes time and energy. If you did learn this way, as so many millions of people have, you will find that in time a strange thing happens; given enough practice and actual usage, you begin to copy instinctively. Why, when you were taught to copy translatively? Because, despite the method and mode of learning, the brain is smart enough to take the most efficient path. Once the student or code operator has gotten familiar enough with the language of the code, the brain bypasses the translation mode and goes directly to interpreting the sounds into letters.

This is what happens to code operators who get "stuck" at eight or nine words per minute and can't get over the so-called 10 WPM hump. With enough on-air practice, eventually the left to right brain transition (switch) takes place automatically and the code operator "breaks through" to instinctive copy. Now there is no longer a need to consciously translate dots and dashes, as the right brain does all that work for you.

Routine Thinking

Think about it; when someone talks to you in your native language, do they spell the words to you or just say them? If they spelled the words, you would have to interpret the spelling of all the letters into words in order to know what they were trying to say. Likewise, if they pronounced each syllable distinctly and separately, you still would have to listen very carefully; mentally put the separate sounds together, then interpret that into words. When words are spoken to you, you hear each word as a total sound. The sound is unique to the word. That sound means something to you; you just don't give it a second thought.

In our normal routine of daily life, we are constantly fed various forms of information. We process it in different ways. Sometimes the processing is automatic: instinctive – sometimes it's work: interpretive.

Remember our brain, the carbon-based computer? Remember how it wants to deal with analog data? Did you ever look at a digital clock – read the numbers – then pause for a second in order to figure out what time it really is? When the clock displays 8:47, you might have to ponder that information (interpret it) in order to finally realize that, in fact, it is 13 minutes to nine o'clock. What about those "old" standard clocks with the hands that move in circles and the dials marked with numbers from 1 to 12: analog information; you don't have to consciously read the numbers to tell the time. Just a casual glance at the clock, and instinctively (and instantly) you know the correct time by the position of the hands. This is just another, but very common example, of how we humans are designed to accept and process subjective and analog information instinctively.

Think about some things that you see, hear, touch, taste or smell and immediately know what they are. Think about when you didn't know what they were just by receiving data input from your five senses. You had to learn that sugar is sweet and vinegar is sour, fire is hot and ice is cold. Think about things that even today are not instantly recognizable. Maybe an unfamiliar word or, as in the example given earlier, someone reciting letters instead of words. All of this unfamiliar information must be translated in order to have meaning. To our senses: the unfamiliar is objective and requires thought; the familiar is subjective and recognized instantly. So it goes with the beeps you'll hear as Morse Code. Once you become familiar with it and learn what the sounds are . . . you will copy it instinctively.

The Philosophy Of Learning The Morse Code

ANOTHER LANGUAGE

The code is a language. There is nothing magic about it. Whether you are learning your first language or a second or even third one, you hear sounds that will eventually mean something to you. But at first these sounds have no meaning. Maybe you have never even heard these sounds before. They may be totally foreign. Maybe you have heard them, but since they had no meaning, you chose to ignore them. However, given some repetition of these sounds and some instruction as to their meaning, you would begin to learn this new or strange language.

If you were raised in a family where a second language was sometimes spoken, you automatically would have picked-up at least some of this secondary language. With only occasional, but ongoing exposure to it, you would understand the sounds and meanings of many words in short time.

OUR FIRST LANGUAGE

Infants, as they approach the age of one year old are already learning a language. They don't study to learn how to hear words, speak words, understand meanings and form mental pictures. They learn by association and repetition. When the same person, day after day, hour after hour, hangs over the crib and says "Ma-Ma," the baby will get used to the sights and sounds and in time understands: *that is* Ma-Ma. Eventually, the child will repeat the sounds of Ma-Ma. This is a primal example of eye, ear, motor and brain coordination. The spoken word is just an extension of the brain. The mind already said Ma-Ma and then tells the mouth to say it. All this will happen when the physical motor skills of speech are ready to perform in harmony with the brain.

Likewise with the code, you will hear sounds that will trigger a familiar thought and you will automatically respond by writing on paper what you have heard. As you increase in proficiency you will begin to hear whole words and phrases.

A SECOND TONGUE

It's not just infants who learn a new language. Every day, people are learning a second language. Children in elementary school are being taught secondary languages. At first, they must *translate* words from English to the foreign language in their heads. This is a memory recall process. They need a look-up table and scratch pad in their minds. Eventually, through repetition and practice, there will be an instinctive transition from the native word to the foreign one and vice versa with no conscious effort on their part. They will have gone from a translative process of comparing the sound they heard to the sounds that they have memorized, on to an automatic recognition of a sound and its meaning – instinctively.

COMMUNICATING WITHOUT THINKING

We do that same kind of instinctive process every day. In casual conversation, we can rattle off paragraphs of thoughts without ever searching for a word. The thoughts, visions and mental pictures in our heads spew forth as the spoken word, without so much as a casual thought. When discussing something of a deeper nature, something that we don't generally talk about in our day-to-day routine, we choose our words carefully, searching for the correct word to convey our thought. We scan, search and sort words, rejecting all but the most proper one which becomes the word we actually speak. This is all done in the interest of most clearly and accurately expressing a thought, making a point or relating an incident. Put another way, if unfamiliar with the subject material, we will hem and haw our way through the conversation as we translate our thoughts. However, if we are familiar with the topic, our sentences will flow smoothly and evenly in a very direct and to-the-point manner while we instinctively speak our thoughts. As you can well understand, therein lies the mechanics of physically displaying our thoughts, ideas and images. Usually we do this by speaking or writing.

It is essential that these instinctive and translative thought processes are completely understood: the things that we are most familiar with, those things that have a repetitive nature in our lives, are processed by our brains INSTINCTIVELY, and conversely, things that only occasionally enter our routines must be dealt with by conscious and cognizant manipulation, control and TRANSLATION.

INSTINCT AT WORK

Our instincts are constantly working for us. Our basic instincts help us to function on a minute-to-minute basis. They supply us with the most fundamental drives, skills and abilities. They tell us how, when, where and what to do in order to survive and to live in an effective and comfortable manner.

When we learn skills, they become an enhancement of our basic instincts. Different forms of communication are some of them. Our primary forms of communication are speech, hearing, facial expression, gestures and body language. To expand our communications capabilities, we can learn another spoken language. We also can advance our ability to communicate, with the new language, in a very efficient manner. With practice, this new skill will become instinctive. An analogy might be found in an office: someone is composing a letter in their head and saying the words as a stenographer writes the spoken words. Does the steno write the individual letters and words? No. The stenographer will write symbols which correspond to certain sounds. This is a skill that the steno has acquired through practice. Does the steno think of the spoken word, translate it into the symbols which correspond, then write them? No, again. The steno hears the words and instinctively writes the proper marks on paper. Likewise, the steno will do just the reverse when transcribing from shorthand to the printed word.

As with the steno, the Morse operator does not translate thoughts, but rather hears sounds and instinctively writes them down or thinks of letters and words and instinctively "keys" them into the transmitter.

It's just another example of *instinct* over *translation*.

THE NAME OF A CHARACTER

Phonics; according to Webster: "a method of teaching pronunciation for reading and speaking by learning the phonetic value of letters, letter groups and syllables."

Let's redefine this word as it applies to our purposes with a slightly different content and essentially the same context.

Phonics: "a method of teaching pronunciation for receiving and transmitting by learning the "sound" of characters and character groups."

If all this sounds a little confusing, don't be concerned. The sciences of Phonics and Phonetics are very deep and involved. However, as it applies to us, it's really very simple; let's walk through it.

I am going to ask you to spell the word "DOG". Well, since I am writing it here in this book and you are reading it from these pages, it would make good sense to spell it out in *our* language using *our* alphabet. That way, I know what I'm writing and you know what you are reading. Now, when you spell it for me, you will probably say, "dee-oh-jee." You have just verbalized the phonetic values of the letters which spell the word "DOG"; that's phonics!

Suppose I tell you that the names of those letters are incorrect; that they are called by a different name (or sound). What if I tell you that the first letter is not called "dee", but rather "dahdidit"? The second is not pronounced "oh"; it is spoken as "dahdahdah"? And finally, the last letter is not named "jee"; you speak it as "dahdahdit"? Do you think you would have much trouble learning to hear, recognize or speak these three characters?

Do you think you would have much difficulty learning a new language of only 43 characters? When I ask this question, most folks answer, "No, I won't have any problem learning *only* 43."

Okay, DOG is a simple word that you learned to spell in nursery school. Let's try another word; a bigger, longer word.

In the first six lessons of this code course, you are going to learn the following letters (amongst others) and their sounds:

A	didah
E	dit
N	dahdit
T	dah

It shouldn't be too difficult to learn these four sounds. Now I will transmit a word to you:

didah-dahdit-dah-dit-dahdit-dahdit-didah.

After learning the above four letters and their sounds, it would appear to be a simple matter to "hear" the following letters:

A-N-T-E-N-N-A.

It should now be easily understood what phonics and phonetic value are, as they relate to you learning the Morse Code.

DO ..... remember, the phonetic value of a character is how it sounds as sent in tone "beeps" in Morse Code. This is our new language of 43 sounds.

DON'T ..... use the English pronunciation of our letters, numbers and punctuation. They are for literary, conversational and text usage only; they are not the sounds of Morse Code! You do use them, however, to write on paper; the letter symbols of our alphabet that you heard as dit and dah sounds.

DON'T ..... think about dots and dashes. These are just graphical representations of the sounds you are hearing. They have no place in sending, receiving or writing your copy.

Suppose you are doing all the DON'Ts. Here's what happens when you go through the laborious, counterproductive process of *translative* copy:

- *The speaker in your receiver barks out, "beeeep-beep-beeeep-beeeep."*
- *Your left brain hears, "dash-dot-dash-dash", but it doesn't mean anything.*
- *The left brain tells the right brain," You're in charge of sounds; what did that mean"?*
- *Your right brain doesn't recognize this foreign sound; it has no meaning. It tells Lefty, "I don't know; never heard it before."*
- *Now your left brain has got work to do. It has to translate. It writes it on your mental "scratch pad," then it goes to the "look-up" table which is stored there because you memorized a dot and dash code chart. It scans the chart in your memory and recognizes the written letter "C". Oh boy, almost done. No, wait; that would be "Dash-dot-dash-dot". This is "Dash-dot-dash-dash". Wait a minute. It goes back and looks at the mental chart again. Hummm, there's another letter similar to "c"; oh, yes, "Y", that's it. Then, just to be sure, it actually looks up "Y" to confirm it.*
- *Since your left brain is in charge of writing, it must shift from searching the lookup table and tell your hand to push the pencil and make a "Y."*

Now, let's see what happens, step-by-step, when you are hearing the phonetic value and doing good *instinctive* copy:

- *From your receiver you hear: "Beeeep-beep-beeeep"*
- *Your right brain hears: "Dah-dit-dah"*
- *Your hand instinctively causes the pencil to mark a "K"*

What a difference!

Or, to put it in an easier-to-understand way; let's look at this *"all-telling"* picture of the mental gyrations for both translative and instinctive modes of information processing. It is presented here in tabular form to enable the student to have a clear understanding of what happens in both situations.

UNDERSTAND and REMEMBER this chart.

TRANSLATIVE MODE

TRANSMITTING	RECEIVING
Memorize the Code chart	Memorize Code chart
Think of the letter to send	Hear a sound
Put the letter on your mental "scratch pad"	Put sound on your mental "scratch pad"
Find the letter in your mental "look-up" table	Convert dit/dah sound to dots and dashes
See the dots and dashes	Put dots and dashes on your mental "scratch pad"
Put the dots and dashes on your mental "scratch pad"	Find dots and dashes in mental "look-up" table
Convert the dots and dashes to dit/dah sounds	Convert dots and dashes to letter
Put the dit/dah sound on your mental "scratch pad"	Put the letter on your mental "scratch pad"
Send letter	Write letter

INSTINCTIVE MODE

TRANSMITTING	RECEIVING
Think of letter to send	Hear the sound
You already know its sound	Your already know the sound
Send the letter	Write the letter

Well, everything's easy when you know how to do it the right way!

LEARN THE CODE THREE TIMES?

Yes indeed. Many people learn the code and then relearn it as many as three or even five times. That could be an alphabet of from 129 to 215 letters! What happens is that they think they have learned the code the first time. Actually what happened is the all-to-common memorizing of the code alphabet. This can happen in a few different ways; the most common being someone who wishes to learn code for the first time and listens to 5 WPM tapes made with true or actual timing (non-Farnsworth). The student is then placed in a situation where he or she is forced to think objectively. That is, they are told the name of a letter, then fed a series of "seemingly unrelated" beeps. The student is now forced into the process of memorizing dots and dashes. Additionally, in order for the thought process to be complete, human nature and the way the brain works automatically creates a lookup table and scratch pad in the very active and conscious part of the left brain. Messages in the form of different length beeps are received, translated into dots and dashes, looked-up, placed on the scratch pad and finally put in the form of an order to the muscles of the writing hand. Adding to the confusion is the fact that the spacing between the elements will seem exaggerated. You might hear "dit (space) dah (space) dit. The letter intended for you to learn was "R"; and chances are that you will remember those sounds as "R." Students who learn the code by sound would have heard "E-T-E." Notice I said "those sounds". That is exactly what it was; three separate and distinct sounds. The letter "R" should be a single sound made up of three quick beeps; "didahdit". You should never have to "listen to" or count or otherwise analyze what you are hearing, in any way. When we learn to talk, we learn "words" not syllables. When we read these words, our mind sees the word not a collection of the individual syllables. When we speak, we speak the whole word as "a sound" not separate and distinct sounds. Why then, would we want to learn this language any differently? Why would we want to make it more difficult? Remember, this is a very critical time in the course. This is where the student is most vulnerable. This is where discouragement can become severe enough to cause the student to quit.

It is very possible to memorize all 43 of these sounds and go through all the mental gyrations of translative copy and pass a 5 WPM test. But, when you decide to get serious and want to be able to copy effectively at 13 WPM, it's going to be a real battle. Now you will have to learn the code a second time. Some students will actually relearn in order to get to 10 WPM and then relearn again, with just enough instinctive copy to squeak over to 13 WPM. By just barely breaking into instinctive copy, a test candidate may possibly pass the 13 WPM code test. Maybe not. Now trying for 20 WPM will most likely be the same story. There is, at this point, the possibility that the student has begun to come out of translative copy somewhat more and increased his instinctive copy enough that advancing from 13 to 20 WPM will be less work and fraught with less problems than he had in going from 5 to 13 WPM. Sometimes that is the case. All to often, it isn't. Quite probably, he may have to learn it again to get to 18 WPM. And, sometimes, again to get to 20 WPM.

It is very important that you understand all of this. To clarify, let's look at a couple of charts.

The first chart represents a broad average of what a student might (hypothetically) go through after first learning the code by translation, the wrong way:

LEARN	WPM	% Translative Copy	% Instinctive Copy
1st Time	5-7	100	0
2nd Time	8-11	100	0
3rd Time	12-14	50-90	10-50
4th Time	15-17	10-50	50-90
5th Time	18-20	0-10	90-100

So, you can see how learning and relearning and relearning again is not only possible, but quite probable when beginning to learn Morse Code the wrong way. A great example of non-intentional, self-punishment; nonetheless, it hurts.

When a student learns instinctive copy from the beginning, his chart could look quite different:

LEARN	WPM	% Translative Copy	% Instinctive Copy
1st Time	5	0	100
Practice	13	0	100
Practice	20	0	100

These figures will vary considerably between individuals. To confirm some of these data, ask several General and Amateur Extra Class Hams what their experiences were. See how many horror stories you get. If you are not just beginning to get into Ham Radio, but perhaps starting again or upgrading, maybe you see yourself in the beginning part of the first chart.

OF LONG AND SHORT SOUNDS

Besides the characteristic sounds of whole letters, the code will actually speak to you. There are long, short, hard, soft, quizzical and abrupt, final sounds. Although it might appear that we are entering into the subjects of grammar, pronunciation and diction; we are not. Actually we are going to consider a very subjective matter: the way we generally perceive certain character phonic sounds in our minds. This is really an aural exercise; something you will have to do with your code practice oscillator or while listening to your tapes or computer tutorial, even though it works equally well if you just pronounce the character sounds, or say them in your head. We can touch on some of the more common characteristics here to get you started in listening for them. You can then add your own, as you progress through your course and subsequent upgrade studies.

Actually, this is less than an exercise; it's more of a collective observation from many individuals. **It is in no way intended to be a mnemonic or any other memory aid.** Whatever your observations, whether similar to ours or not, whether you hear any at all or not, or find some new ones of your own, please bear in mind that the observation of the characteristic sounds of these phonics are very personal in their subjectivity; they are only intended to illustrate a general commonality between the character and its sound. We do it all the time:

"Look **OUT**"! – **WATCH** it"! – "Tigger, **GET** down"! – "**OHHH** boy, apple pie"! – "**PHEW**, that was tough"!

It's not always what word you say, but how you say it, in order for it to have a specific meaning. The meaning comes from tone, intonation and inflection. In fact there are many sounds that are not real words which carry their own specific and definitive meaning. We do a lot of communicating with sounds that are not words. I

would be hard pressed to get their meaning across by trying to spell them here; but, suffice it to say, they are a very important part of our day. Listen for the phonic the next time a very tired person plops down into an easy chair. Listen again when he tries to get out of the chair. How about the sound you vocalize when you strain to lift a heavy object? How about when you finally set it down? Even *yawns* and *sighs* sometimes have significant meaning in our communications. Enough (*moan*) of this (*groan*), let's move on.

Basically, what we are looking for here, is the phonic of a letter, number or punctuation which is (or seems to be) *characteristic of the particular nature of the character itself.* This is so subjective, that the old saying really applies, "*A picture (sound) is worth a thousand words.*" Let's look at some I have heard and others which have been brought to my attention.

Dididahdahdidit ..... Does this character with its short, rising ending, sound like a question mark?
Didahdidahdidah ..... This has a very final sound; like the period at a the end of a sentence.
Dahdidahdit ..... Like a hard "C" (cat)
Dahdidahdah ..... A softer "C" like letter: "Y" (yes)
Dahdahdit ..... Hard like a "G" (gut)
Dahdididit ..... Singing like the letter "B" (beee)
Dahdidit ..... More singing in "D" (Dee)
Dahdahdah ..... Is this an "O"? (Ohhh)
Dididit ..... Sound like an "S"? (Essss)
Dah ..... The long, simple sound of the phonic "Tee"?
Dit ..... The very short sound of the spoken letter "E"?
Dahdahdidit ..... "Z"? (za-ee)

Anyhow, you must get the idea. But, please do not try to create a memory-enhancing scheme, mental pictures or other gimmick from all of this. You will in time, if you haven't already, develop a sense about the sound patterns you hear, kind of a dialect. I think just about every telegrapher develops, to some extent, some kind of phonic association between the English spoken character and its phonetic value.

If you are not totally clear about this phenomena, reread this and the previous section "THE NAME OF A CHARACTER."

EQUAL OPPORTUNITY

When discussing instincts and skills, we mentioned that "we all have the same opportunity for development." This is very true as far as our basic instinctive qualities are concerned. We also said that, "some individuals will progress faster than others," this also is true, due to *specific* instincts; the ones we inherited through genetics, not developed through practice. Because of these differences in human makeup, this becomes a good place for discouragement to occur; and it does happen. Always remember in your studies that some people are a little more predisposed to this kind of learning. We all have the same opportunity for development, but because of certain specific instincts, about one half of all students will grasp any new language a little faster and a little easier than the other half. This has nothing to do with how well a student learns or the strength of his information retention. Be assured that regardless of your specific instinct inheritance, you still have an equal opportunity to arrive at your goal.

The next several sections describe in detail what happens in the cases we just discussed and how to cure the problems.

If anything up to this point is not totally clear, please review those sections, now.

Kinds Of Lumps

THE HUMP

For many students who learned the code by memorizing dots and dashes, there exists a very real obstacle. For some, it is like a stone wall. It is when all progress actually seems to stop while studying to go from 5 to 13 WPM. It is usually referred to as the "10-word hump." What could have happened, when you were making such good progress up through 7, 8 and 9 WPM? Remember translative copy? Well, this is at or about the point where the brain runs out of time doing all its interpretations. When listening for dots and dashes and translating them into letters as they stream by; your brain can only work so fast. While increasing your speed from five words per minute (WPM) to about 10, the time required for the translation exceeds that of the capability of your brain. Consequently, you hit the "so-called" hump. Have faith in yourself and the hump will eventually be overcome by continuous practice and constant commitment and determination. Stay at 18 WPM Farnsworth, slowed down to your speed or faster; in time the right brain will take over this very laborious task from the left brain and you will begin to copy by instinct.

After passing the hump, most people find that they sail off to 15 or 18 words per minute with very little additional practice. How rapidly this progresses is a function of how keen your instinctive sense has been polished.

A BUMP

Some individuals run into another hump at about 18 WPM. Actually, this is just a point where the instinct reflex has run out of time. Everything seems to be working right, you just can't get to 20 WPM. If you can copy 18 WPM consistently; you are probably not brain switching and certainly haven't developed a mental block. Then what is it? Remember, you are not really used to relying solely on your instincts. They need to be developed. Your subjective processes need exercise. For example, you might think of it like when you first learned to ride a bicycle, go bowling or sew needlepoint; like these or any other activities, the code is a skill. You begin at a controlled and guarded pace. You are cognizant of all details and everything around you. You are consciously aware of your every move. As your skill improves, you participate with increased speed, greater flexibility and less conscious effort. You become more comfortable with the activity. It is getting to be second nature. It is becoming a part of you. As with any of the skills you have already learned, the code, and becoming proficient with it, will take some practice, a little time and effort. So, as you begin to gain confidence, as you start to really feel comfortable with the code, as you approach 20 WPM, something happens; you get stuck there. It's almost enough to make you feel discouraged. But, don't despair, it's easy to fix it. To cure this, just keep practicing the copy and honing your instinct response. Try 25 to 30 WPM. Don't listen to anything slower! In time, this bump will pass and you will be copying 25 WPM or better, before you know it.

BRAIN PROCESSING SPEED

Now that we have defined Humps and Bumps, let's analyze them so that we might have a clear picture of what happens. It is very important to fully understand these phenomena and maintain an awareness as to what might be happening should you encounter them.

Let's consider, for example, Extra Class code speed as the "worst case" scenario. We are given the following data as the standards by which all test requirements are established:

1. The standard word is five letters long. The usual example is the word "Paris."
2. The word contains 50 bits of time; that is to say; it can be broken up into 50 equal pieces of time all of which are the length of a "dit." The 50 piece word contains dits, dahs, element spaces, letter spaces and one word space, see; "Code Formation and Structure", on page 33.

If you were physically and mentally capable of the impossible **translative** copy at this code speed here's what would be happening:

> If we have a code speed of 20 WPM (X) 50 Bits per word then we would have 1,000 bits per minute! In a more imaginable way, that would be 1,000 bits per minute (/) 60 seconds per minute for an impossible 16.7 bits per second! If you were capable of processing almost 17 bits of information per second in your head and then translating them by using a memorized Morse Code chart, you wouldn't have to concern yourself with this or any other code course.

Now let's look at **instinctive** copy at the same speed:

> If 20 words per minute (X) 5 characters per word (=) 100 characters per minute; then 100 characters per minute (/) 60 seconds per minute (=) 1.67 characters per second.

What a difference! Do you think you can write or print at that rate? That's about 17 characters every 10 seconds. Almost anyone can write that fast with little or no practice.

You can see from the examples above that with instinctive copy we do not concern ourselves with the "bits" of information which go into each character's makeup. Rather, we just "hear" the letter and write it down.

I purposely didn't give an example of the math at 13 WPM and the number of bits and copy time involved. You can do that for yourself if you choose, but I think that the illustration given really makes the point. It is at or near the 13 WPM speed at which the "Hump" occurs if it's going to happen at all. Most students who experience it find that they are missing copy somewhere between eight and 12 WPM. This is where continued practice is essential in order to break that barrier. Unfortunately, this is also the point when the student might be the most vulnerable. Do not be discouraged if you hit this barrier like a stone wall. **It will and does go away!** Occasionally, someone will get through their 13 WPM code test while still copying partially translatively. These folks are far and few between. Don't make this part of your plans. If you could do it, you might end up taking the test several times before squeaking by. I guarantee it will hinder your progress if you believe that you can continue copying like that; you probably will become discouraged and there is a good chance that you'll never advance any farther. Stay with it; don't allow yourself to become discouraged. If you begin to feel negative emotions, reread the areas of this book that are concerned with your present situation.

WORD COPY

Suppose you stay with the code after you have done all your upgrading. Suppose that you really enjoy making CW contacts and are on-the-air just about every day. You start to hear words, not just letters and numbers but actual words. Sound far fetched? It's not. Just as you learned to hear the sound of letters and not the individual elements, so, too, you will hear the sound of words and not the individual letters. As a matter of fact, when studying for your General class license you should already be hearing some basic "groups" of characters; like "CQ," "My," "the," "RST," "QRT," "UR," "73," etc. But now, you are recognizing whole words that are a little longer. You might hear and instinctively write "antenna," "Transceiver," "meter band," and "occupation." Maybe you recognize, "I work as a" or "My hobby is." If you enjoy it and stay at it, word copy isn't far away. Let's look at what happens at 20 WPM when you can instinctively copy most of the common QSO words: If 20 words per minute (/) 60 seconds per minute (=) 0.33 words per second, then you have three whole seconds to write down each word or an abbreviation of the word.

COPY IN YOUR HEAD

Guess what's next. Right; copying Morse Code in your head! This moment, right now, is an important time in your Amateur radio endeavors. Right this second you should be able to imagine yourself leaning back in your chair at the operating position and hearing words coming out of the speaker or headphones and not writing a thing except for jotting the occasional note or two. Can you see that? I hope so. That's going to keep you going if you want it to work out that way.

A BORED BRAIN

The bored brain is a safety mechanism that is built into all of us. Under conditions of mental fatigue or information overload, our brains will become weary. The tired brain is stubborn and will refuse to continue learning. It will reject the same kind of new information that a little while ago it was aggressively absorbing. We can go about our daily routine business quite effectively with a bored brain. Under this protective safety mechanism, we can actually feel good, serene or even happy. We might even go about our business whistling or humming. We will function in a very mechanical manner, but all the chores and tasks will get done. They get done in a very mindless way, but they do get done.

Did you ever have one of those real tough days at work or school and after arriving home couldn't remember many or any of the details of the trip? The data-seeking part of the tired brain went into slowdown or shutdown, but the mechanical portion took you down the proper streets and through the correct turns to get you home.

A double or triple session can be like that. You can be sitting there happily copying the new letters from that lesson. You may think that doing this second or third session is very productive, but, in fact, your mind is in "neutral." You have managed to learn the sounds of a couple of new letters and then went into "mechanical mode" doing accurate but mindless copy. Chances are very good that you are not absorbing anything. Probably, at your next session, you will remember little or nothing from the previous session.

Try to recognize the signs or feelings of a Bored Brain. Don't overdo the number of sessions during any one sitting. Create a schedule which places your sessions in parts of the day that are good for learning. Don't schedule the sessions to "fit-in" to your daily routine. Generally, those "fit-in" times will not be the best times for learning. Design your schedule to allow a few "quality" minutes, two or more times a day out of your busy routine for your code work.

MENTAL BLOCK

Very simply put, mental block comes from three sources. Brain overload from trying too hard, overload from too much cramming and from switching back and forth between instinctive and translative copy.

Trying too hard causes a temporary shutdown of the present thought processes. If you become overly demanding of the brain, ordering it to stay on "alert" for too long, it will become too intense in its sensitivities to outside stimulus. That's when it shuts-down in order to protect itself from further abuse. It (you) will not be able to concentrate.

Too much cramming, especially just before a test session may fatigue a brain. At some point it is going to want to rest for awhile. That rest may take place at the worse possible time.

Switching to translative copy in order to "catch" a missed character, read your copy or anticipate the next character will very likely create a temporary mental block, and cause you to miss several characters, at best. Switching back to instinctive copy may take quite a bit of time and effort on your part.

Remember and use "STUDYING AND PRACTICE HINTS" Number 6 on page 24. If you focus on what you are copying and "only" on what you are copying, you will minimize the chances that you will ever experience mental block or switch off to translative copy.

However, if you have experienced this situation, you should examine your code practice and copying habits to determine if you inadvertently developed mental block from one of the three causes above. If this is the case, practice avoiding the above three causes. Also, reading the section on "TAKING THE EXAM" should be of help.

EVERYONE HAS SKILLS

The lessons in this book are designed to allow a given amount of information to be exercised, practiced through repetition and subjectively absorbed. This is how learning a second language happens; this is how acquiring a skill is accomplished.

It is important to keep reminding yourself that this is a skill that you are learning. It is not an academic course, but rather a talent. Everyone has it, but it must be developed. You have learned many skills already, this is just one more. If you can ride a bicycle or hit a baseball or shoot a basket, catch a football, dial a telephone, walk, talk or read this book, then you can learn the Morse Code. These are all skills and I'm sure there are many, many more that you didn't realize you had. Think about the skills you have already; maybe make a list. It will be a long list and you will be adding to it daily. So what is this thing about learning the code? It's just one more skill to add to the list.

With many people, there seems to be a stigma attached to Morse Code; almost like it is only for a select few, something that is out of the reach of the average person. I have heard things like: "She's too young," "He's too old," "I can't learn something like that," "That's too complicated," "I don't have the time," to mention only a few. Nothing could be further from the truth. Morse Code can be for anyone!

Lessons And Sessions

WHEN TO STUDY

Only you can establish a schedule for yourself. Everyone's schedule will be different. The average code student is comfortable with two or three sessions each day. Some people will want to do only one session per day, while others will want to do four. Students, office workers, trades people, factory workers, retirees and the self-employed will all probably structure their programs differently. It is important to determine a suitable schedule and stick with it. Your schedule may be modified during the first few lessons since you are just beginning to get the feel of the pace you have chosen. Don't fight the pace; instead, modify your schedule, if necessary, at the beginning so that you are not putting undue pressure on yourself. Use the following points to assist you in planning your study schedule.

You should have:

- A quiet time and place
- A time when you are mentally alert
- An unrushed five to ten minutes

You should avoid:

- Busy or noisy areas
- Times when you are tired, fatigued or not fresh
- Periods between major or extensive activities

Ask yourself:

- Will I be comfortable and secluded
- Am I alert in the early morning or late evening
- How well will I function with a full/empty stomach
- Will I be trying to "fit" the session into a busy time

There are many more factors to consider. Use common sense; be honest and fair with yourself.

THE SCHEDULE

In order to have a successful session, you must want to be doing that lesson. If you approach the lesson as a chore, if you view your next session as work, little or nothing will come from your efforts and labors. In fact, you will probably regress and create a stumbling block. These stumbling blocks are delays in the path of study. A bad session creates a gap between the previous session and the present one. Stumbling blocks can lead to mental block. It will be a kind of shut-down of your subjective receptiveness. Remember: the right brain wants to have fun; it wants to enjoy itself. If a session becomes a chore, you won't get very much cooperation from your subjective side. Always keep it light. Don't drag yourself off to the desk, because; "It's time to practice." You must feel that you want to be there. This is not an enemy to battle; it is a friend to have fun with.

A SCENARIO

You are practicing code according to a schedule that fits your very busy life style. Your schedule calls for two sessions each day; one at 8:00 AM and the second 7:30 PM. Last night and this morning you studied Lesson Six. The sessions went very well and you are quite pleased with yourself. You understood all the material and had increased your skill. Everything really "sunk-in." It is all now part of your memory. You had fun doing those two Lesson Six sessions. According to your schedule, your next session will be, as

usual, at 7:30 this evening. But you heard that something interesting was going to be on the local TV news and right after that, your favorite team has a ball game. What to do? You modify your schedule a little, taking 10 minutes from the end of the news and five minutes from the pre-game show. During these 15 minutes, you squeeze in the session. The session is something that has to be done and you did it. You got through the entire session quite dutifully and in the spirit of being responsible. When the game starts, you have a feeling of accomplishment because you didn't skip a scheduled session. You have avoided feeling guilty. Pretty good, huh? Nope! You just did everything wrong. Remember attitude and emotion? You have allowed your attitude to change regarding the learning process. You have just committed one of the most common mistakes in learning anything! You made work out of it.

WATCH OUT! FUN

When pursuing an endeavor, such as learning the skill of Morse Code, the person who has fun, who wants to be doing it, will arrive at the goal in the shortest amount of time. The person who feels that he has to work at it, will take much longer, expend more energy, not learn correctly or accurately, and may actually fail. Disappointment in yourself from lack of progress is the greatest element in failure. It is the beginning cause in a progression of negative thought, attitude and emotion. Disappointment is a malignancy which grows geometrically. It must be stopped by your positive *attitude*. Don't let it become an *emotional* battle. Some battles will be won; the war will be lost. The minute a lesson session ceases to be fun and exciting is the minute you should stop and examine your feelings about your goals. Discard any thoughts of your own disappointment and whatever setbacks you have had. Think positive. Go back and reread the basics of Commitment, Determination and Discipline. Make it clear to yourself that arriving at your goal will be thrilling. Understand that learning this skill is not a big endeavor but rather a series of very small, simple lessons. You may not be able to jump a large stream but you certainly can get to the other side on very carefully planned stepping stones. You will be pleased with yourself to arrive on the "other side" with dry shoes.

FEELING GOOD

No matter how good you are feeling, don't try to do marathon sessions. Normally, you shouldn't try to do more than one session per sitting. There will be times when you feel real good about your progress and you'll want to press on; that's good, do it. If you feel excited that everything is going well and really want to continue, that's a sign that you are especially receptive and that is the time of very effective and efficient learning. But remember, at the next session, start at the scheduled place. Go back to where you finished off on your last scheduled lesson and repeat the material you felt so good about learning.

You can stay with the session until you begin to feel the inspiration wearing off or start to feel fatigued, then stop. Stop immediately; never under any circumstances force yourself to study. You must understand that even if you feel good and are going to do two or three sessions per sitting, after a while, your brain will not absorb with the same efficiency as you might think, as it tends to tire under information overload before you are aware of it. Even when you are excited and really having fun, your learning capabilities will begin to fall off rapidly. Work ahead if you choose but always go back and start at the scheduled place for your next session.

As with most things, there are exceptions: a good example might be on-air QSO's or off-the-air copying. This is actually recreational and can be therapeutic. It's a good change in routine and a diversion from a schedule that might possibly be running the risk of getting stale. Do this kind of work for as long as it is fun. When you begin to run out of brain power, you'll know it; your copy will start to get sloppy and inaccurate. Think of this kind of practice as the dessert after a nice dinner. Think of it as a reward. Look forward to it and do it often.

Part II: Guidance

Studying and Practice Hints

1. **LET IT GO!!!**

   When copying either from the computer, practice tapes or a receiver; if the sound of a character does not immediately and INSTINCTIVELY go from your ear to the pencil; LET IT GO! There was an old saying amongst the early land-line telegraphers: "Three things you never do while receiving: dwell on a missed character, dwell on a missed character and dwell on a missed character." This is a prime commandment.

2. **STOP.**

   If you start to get tired, discouraged or a little disappointed with yourself or the way the lesson is going or if you are not feeling well, STOP! I cannot overstress how damaging negative emotions can be to your progress.

3. **FUN.**

   Please have fun. Look forward to your sessions. Play with it, it's only code. There are no teachers standing over you with a stick. You are not going to be graded on your results. This is not a test. There are no time limits. This is not academic education . . . you are learning a skill. Enjoy yourself.

4. **SAVE.**

   Keep all of your practice papers. When you sit down to begin a session, put the date and time at the top of the paper. You will be amazed at the encouragement and inspiration this will bring, when, in a week or so, you go back to look over some of your "first" efforts. The progress you have made will really open your eyes to just how far you have come. Do this little exercise often to keep fresh in your mind, just how far you've come. I suggest that you keep a loose-leaf notebook at your practice desk. As a matter of habit, file each session's paper, in order of date and time in your book. Look at it often – see how far you've come.

5. **DO.**

   Practice every day according to schedule. A missed day will take you backwards somewhat.

6. **FOCUS.**

   When copying code, it is sometimes helpful to have a focus point. It is a good idea, especially when pushing your speed limit, to focus on the contact point – the place where the pencil point touches the paper. This practice helps your brain to tune-out other stimuli which can cause distraction and switch your thought process over to translative copy.

7. **DON'T READ.**

Don't try to read while you are copying. Reading is looking back over what you have already written. Reading your copy is just an added burden for your brain. It will try to do two things at once: subjective code copy and objective reading. Guess which one the brain will usually favor. That's right; reading. While you have been training yourself to think subjectively so that you can copy code instinctively, your brain switching remains in a very vulnerable state. You already know how to read and you can probably read much better than you can copy code, so . . . the brain will switch to the easiest task: reading!

8. **DO NOT ANTICIPATE.**

Do not anticipate the next letter or word. When copying, sometimes it is very easy to accurately guess the next letter before it is transmitted. Don't do it! When you see the first few letters of a common word, you probably will be able to complete that word before the sender has completed it. This is particularly true within a given context; such as copying a code test QSO. In a situation like taking a code test or even just doing code practice at home, you have a good idea of what the sending operator is going to be talking about. You know that he is going to mention his job, location, equipment, etc. However, anticipating any of this information can be the single greatest cause of errors. No matter what you think about it, it is still GUESSING!

DO NOT CONFUSE ANTICIPATING LETTERS AND WORDS WITH "TIP-OFFS" "TRIGGERS" AND "WARNINGS." Please read that section on "TEST TAKING HINTS." Know and understand the difference between GUESSING and PROMPTS.

9. **THINK POSITIVE.**

Just about everyone has an equal opportunity to get that first Ham ticket and then upgrade through the various license classes. Within certain limits, "Incentive Licensing" assures us of equality in obtaining our goals. In terms of studying for a license, basically, students fall into one of two categories: those who learn the theory (academic) material easily and those who learn the Morse Code (skill) with a minimum of difficulty. Note the two qualities and think about which one describes you the best. Generally speaking, the theory portion of a license study course will be learned easier and faster by people educated in the various technical fields (especially electronics). And usually, the skill of Morse Code will be mastered quicker by individuals whose occupations are outside the technical fields. Notice that I use the words "generally" and "usually" as these are observations and not hard-and-fast rules. However, there is a very real *trend* which suggests that technical people tend to be more "left brain" dominant and objective; whereas many nontechnical people seem to be "right brain" dominant and subjective. Neither one is good nor bad. This is where the *equality* comes from – two types of exams: academic and skill; two types of people: analytical and instinctive. (Refer to "OUR TWO BRAINS" and "LOGIC.") Everyone already has some talent; maybe the aptitude for education or maybe the intuitiveness for picking up a skill. Probably some fortunate few have both. Just remember: "Incentive Licensing" makes it fair to everyone. Think Positive!

Self Instruction vs Classes

A good part of this book has been devoted to telling you about the many ways in which you are an individual, and likewise, an equal number of ways that you are very much like anyone else.

There will be one important difference between you and some other code student: whether you are best suited to a self-study program or classroom instruction. You will have to give this matter some thought. You may even want to discuss it with another Ham; an Elmer, a VE or instructor. Since it's very difficult to be objective about yourself, you might select the wrong way to go. Many students undertake both routes and find the best one by trial.

Others just make up their mind that the best way to go is the way they decided. Some are correct in their assumptions; others just keep on struggling along with an improper choice. If you should have any doubt as to which method of instruction is best for you, by all means ask someone who is qualified to give you the guidance you need.

Naturally, if you elect to take code classes at the local radio club, they will probably be only once or twice a week and for about one hour to ninety minutes at each sitting. Obviously, this alone will never teach you the skill of Morse telegraphy. What happens with class room instruction is that you are given formal guidance as to what to do and study and then told how and what to practice at home between classes. This is sort of a combination of both methods except that your homework pace is more or less defined for you.

If you decide that you are going to do this on your own, the first part of this book becomes extra important. You must have no doubt, whatsoever, with your feelings about commitment, determination and discipline. You must be very comfortable with your understanding of everything up to the first lesson. Since there will be no instructor, you will have to rely on yourself and me to get you from Lesson one to 24. Problems and questions may arise from time to time. You can ask for answers but I can't give them to you unless you go into the text and find what you need. Never hesitate to stop what you are doing and reread something that's unclear or perhaps confusing to you.

Now, let's look at some of the points to both of these options.

SELF STUDY:

- You can tailor the program to fit your schedule.
- You can control your progress by not proceeding to the next lesson until you are comfortable with the present one.
- You may advance as quickly as your skills allow and not be held back.
- The formality of a class may make you anxious or apprehensive.
- You will not have the distractions of an unusual environment.
- You will not be forced to study a lesson if you are not up to it.
- If you tend to be more of a private person, you will not feel the presence of any peer pressure or competition.
- You may turn out to be the strictest instructor you have ever had. That's good.
- Home may be the best place for you to concentrate.
- You may be the most relaxed and comfortable at home.

CLASSES:

- You will find camaraderie; others sharing a common goal.
- You will find reassurance; others experiencing similar difficulties.
- Instant guidance will be available to you from the instructor at hand.
- It will help you to accept and commit to a schedule.
- There will be additional incentive to study harder if you begin to fall behind.
- You'll get inspiration from a compliment or a pat on the back.
- There will be a tendency to keep a good study schedule in order to be prepared for the next class.
- You may need to get out and away from home distractions.
- Detachment from a familiar place may improve your learning ability.
- The formality of a structured class can make a more strict learning environment.

These are but a few of the most often discussed virtues of the two options. Think about it. Talk to someone about it. Remember, if your first choice seems to be a little awkward or somehow not quite suited to you – try the other.

Sending vs Receiving vs Operating — For Practice

This is another one of those can-of-worms subjects. The best advice I can give on this topic is to listen to advice but do not, ever, allow yourself to be persuaded at that moment. On the spot decisions, based on persuasive discussion can only cause a mind-set which could bias you in the wrong direction when trying to evaluate and balance your options concerning advanced study and practice. You will get so many opinions about those three modes that probably all you will accomplish is the passage of time. Chances are, if you were to start that discussion and keep a tally of the opinions and advice, they would be quite balanced in number and consequently cancel each other out! As I say, listen; store all the data; sort it out later.

Here's what to look for and what to look out for.

Sending: As far as the way the brain works, it is not a good idea to send too early on in your studies. Sending is good practice for a few reasons, but it can also lead to translative thinking. So, be careful; if you find yourself visualizing character elements in your mind, put the key away. When you are sending, you should be sending character "sounds" and not using that lookup table in your mind to convert letters to elements. "R" should come out "didahdit" and not "dot-dash-dot". If you find that you can send by sound, then by all means, do it. There is no set time in your studies or practice to begin. Suppose you are working on Lesson #5 and you feel that the sounds of the characters you have studied are really part of your Morse vocabulary, go ahead; send. It's probably time for you to get out the key and tape recorder. I mentioned above that sending is good practice for a few reasons, and if you don't get into the translative trap, it will allow you to develop your "fist," let you hear yourself when you replay the tapes and best of all, give you the opportunity to make your own practice tapes. Additionally, you will gain confidence with the key. This is where many first contacts become something less than ideal memories. There is a better chance of getting nervous while transmitting during your first QSO's if you haven't had sufficient key practice. Your key should eventually become a familiar friend that you are very at ease with. However, some people are not ready to send until after they are very comfortable with the sounds of the 43 basic characters. Others, as in the example above, will start to practice sending and developing a good "fist" in the first week. I strongly recommend to students to send to themselves via a tape recorder as soon as they have a few letters and numbers learned. Remember, as long as you send a "letter sound" and don't translate, nothing but good can come from this practice.

Receiving: Never, ever hesitate to listen to code unless it is sent improperly or too slow for your specific program. Aside from your normal Lesson/Sessions, there are many sources of good code to listen to and copy. (See the section on "LEARNING TAPES AND PRACTICE TAPES," also read the text of Lesson #24.) Many students enjoy eavesdropping. This seems to be particularly true of the youngsters; although many of the older students are still in their youth. . . they just won't admit it. It is quite common to have a student, of any age, come to the instructor before or after a lesson and humbly boast about the QSO he or she copied: "On 80 meters last night the guys were ripping along at better than 20 and I copied enough to know what they were talking about. . . and you know, I can only do about 12 if I haft'a get perfect copy." This is, perhaps, the best practice anyone can have when operating in the "receive only" mode. Try it; it's fun and it's good for you, too.

Operating: Far and away, you can't do anything better than to get on-the-air and make contacts. If you already have a license that allows you to operate CW, do it! Then do it some more. Remember our rule about not copying "bad" or non-Farnsworth type code and stay away from the stations sending slower than your study program requires. If you cannot get on the air, you can operate a "tape recorder station." You, or better yet, someone else can send to your tape machine. You might want to record some of the "strangers" off the air. You can build up a library of tape QSO's. Listen to these tapes and then send back to them as if you were actually on-the-air. It's a good idea to have separate "send" and "receive" tapes so you can preserve your library. Better yet would be two machines; one to transmit to you and the other record your responses. No matter what you do or how you do it, just do it. You will get better at your skills much faster than you imagined.

Many Hams are amazed and inspired by some of the retired professional telegraphers out there on the Ham bands. Many of them can rattle along at 35 or 40 WPM, sending the most beautiful code you ever heard. They were paid to send and receive code 8 to 12 hours a day; they got practice, like it or not. They started the same way as you. They had to practice to gain proficiency in order to qualify for a job just as you must do to get a license or upgrade. So get on-the-air if you can and operate, like they did. You'll just get better, like it or not.

A Few Tough Tests

Periodically, you will probably become curious about just how fast you can copy accurately. It's perfectly all right to test yourself; but, always begin at some higher speed level than you are currently studying. Actually you are normally doing that anyhow while going through the code course. As I mentioned in "SENDING vs. RECEIVING vs. OPERATING – FOR PRACTICE," copying your own tapes, listening to on-air QSO's or having a friend send to you, is not only good practice, but it is a fun way to break up the routine of your lesson/session routine. Just be sure that you don't listen to code sent slower than your present study speed; better yet just a little faster.

Try copying random code groups. Five character random code groups are great for accurate copy. It is also a good way to avoid anticipation copy; where you think you know the next character before it has been sent. In terms of speed and accuracy of copy, five-character random groups are about 20% more difficult than plain text. For example; if you can copy about 20 WPM of random groups, you should be ready for your 20 WPM plain language code test with a little safety margin. Do your random group sessions for at least one minute and no more than five minutes. Don't go slower than your goal speed. Take a break in-between.

Try this one. You should have a good idea of some of your problem characters. These are the ones that you sometimes hear as other ones. Maybe it's B/6, J/1, D/G/W/U, V/U, S/H, H/5 OR (,)/(?). What ever the case, have someone write a script and then record a random run of these characters for you. Use the script to check your copy. Don't worry about memorizing the copy. If you have two or three minutes of random characters, the worst that can happen is you will memorize the first few characters. After the first familiar characters go by, you will be giving yourself a good test. As before, keep the speed up to your goal speed or something faster. Don't copy for more than five minutes.

Here's one more. As you approach your goal speed, set your computer, code machine or select audio tapes for a code speed 50% faster than where you think you are copying accurately now. For example, if you are approaching 5 WPM, try 8 WPM; if you are nearing 13 WPM, try 19 WPM; and if you are almost at 20 WPM, try 30 WPM. Sounds frightening or ridiculous? Not at all. Try it for one minute. I'm willing to bet that after a couple of sessions, you will be copying better than 66% accuracy. Just think; 66% of 8 equals 5, of 19 equals 13 and of 30 equals 20. So, if you get to copy 70% or 75%, congratulations; you've just exceeded your plain text copy speed. If you just about copied 66%, well, then everything is normal and you are even with plain text speed goal. If you copied less than 66% after three or so sessions, then you are just not ready for this exercise. Remember to test yourself in this way, you must have a good command of instinctive copy. *This test is an excellent indicator of whether or not you are having some trouble with total character sounds.*

Most Common Problem Characters

Through interviews with many Code Instructors, VEs and students, it was confirmed that there exists certain, problem characters which are common to a very large majority of individuals. Although each individual student has his or her specific difficulty areas, there is certainly a commonality with these so-called problem characters. If you have not experienced any "chronic mixing" of these characters, do not concern yourself with this section.

In most cases, the problem characters fall into two categories:

Reverse sound • Close sound

The most commonly encountered characters are:

READ ACROSS

Common reverse sounds:				Common close sounds:			
B	dahdididit	J	didahdahdah	B	dahdididit	6	dahdidididit
A	didah	N	dahdit	J	didahdahdah	1	didahdahdahdah
F	dididahdit	Q	dahdahdidah	F	dididahdit	L	didahdidit
R	didahdit	K	dahdidah	H	didididit	5	dididididit
P	didahdahdit	X	dahdididah	S	dididit	H	didididit
1	didahdahdahdah	6	dahdidididit	I	didit	S	dididit
I	didit	M	dahdah	C	dahdidahdit	Y	dahdidahdah
				U	dididah	V	didididah

The following four letters fall into both categories. Depending on how you subjectively hear these character sounds, determines whether you confuse the opposite pairs, close pairs, or none at all.

READ ACROSS

Reverse sounds:				Close sounds:			
D	dahdidit	U	dididah	D	dahdidit	G	dahdahdit
G	dahdahdit	W	didahdah	U	dididah	W	didahdah

The reasons for hearing the reverse of a character are too involved to discuss here. However, suffice it to say that it is usually due to one or both of two common difficulties: the student actually transposes the element sounds during translative instead of instinctive listening, or, the speed of the code being sent is at the upper limit of the student's instinctive copy skill. Obviously, it would be of tremendous help if the instructor or student could determine which reason is causing the problem. In that event, the difficulty could be addressed and corrected through additional remedial practice. A thorough understanding of the Translative and Instinctive thought processes and how to employ them, as described in this Manual, should be of considerable help.

The reason for mistaking the close-sound characters is almost always the second reason described above: things are happening at the high-speed limit of the student's copy skill. Although the student is listening in subjective mode, the automatic information transition from ear to hand is being pressed to the upper edge of ability. This very common copy difficulty is usually overcome by identifying the problem letters and continuing practice, with emphasis on them.

Part III: The Course

Getting Started

At this time, there are decisions which must be made by the student. Since this is a self-study course, only the student can make these decisions. Although he or she can be advised or otherwise assisted by an experienced Ham, the choice ultimately belongs to the student.

Now is the time for you to make these decisions. How are you going to structure your program? Are you going to follow this course exactly or modify it by adding other resources and facilities at your disposal? Carefully think about the options and choices that follow.

Structure Your Program

This course has a very simple structure. You will be required to have two sources of code-study material: "LT"; learning tapes and "PT," practice tapes, or their equivalent. These will be defined for you on the next few pages; these course lessons are short. How often should you do them? Now is a good time to go back and reread LESSONS AND SESSIONS. How many times can I repeat each one? This is not an easy question to answer. You certainly do not want to rush through lesson after lesson and forget what you have learned in #1 when you are on #5. On the other hand, you don't want to stick to any one lesson too long and bore yourself to tears. The standard classroom method is as follows: If you got less than 90% correct, go back and repeat the material. This is not a punishment. Almost no one will get through the lesson 100% the first time. Be sure that you are not pushing yourself. Remember, there are no Report Cards. Play with the code; have fun with the PT and LT. The moment it isn't fun; STOP! But it should be fun becoming proficient in the skill of copying the Morse Code. Two or three sessions a day should be fine. If you are so inclined, because of your schedule, you can increase that number to five or six. The first few lessons are critical in establishing your program rhythm. You must be comfortable with how you structured it.

The following 24 lessons and requisite Learning and Practice tapes have been carefully formulated to provide a natural progression through the learning process of this skill. However, this course is certainly not the first one ever assembled and definitely won't be the last. The author realizes that there are several other Code courses currently available either on audio tape or computer program. Or possibly there is a Code class at the local Amateur club. Should the student elect to pursue another avenue of study, he/she may stop here. Bear in mind that this book, with or without the 24 lessons, is very generic in scope and purpose. The thought process conditioning and philosophies presented here are for the purpose of efficient and comprehensive study and are applicable to learning most any skill. In any case, this manual can and should remain a reference source to the student.

Now proceed with learning the Morse Code.

Code Formation and Structure

You should fully understand exactly what you are hearing while practicing the code. The following is an explanation of the individual code parameters.

DEFINITIONS:

ELEMENT ..... A SINGLE SOUND; DIT OR DAH.

CHARACTER ..... A LETTER, NUMBER, PUNCTUATION MARK OR PROSIGN.

SPACE ..... THE AMOUNT OF TIME WHEN NO SOUND IS HEARD. RELATIVELY SMALL BETWEEN ELEMENTS (USUALLY EQUAL TO THE DIT, LONGER BETWEEN CHARACTERS AND EVEN LONGER BETWEEN WORDS.

WPM ..... WORDS PER MINUTE.

Basically, the "Farnsworth" method is code sent at a higher element speed relative to the actual WPM speed, but with spaces between the "characters" and "words" increased to slow down the overall transmission to your WPM speed. Under no circumstances should you ever listen to code with *long* "element" spacing.

Once you have acquired speeds of at least 15 WPM, you will be able to operate at the standard baud rate (timing proportions) for elements, characters, words and their associated interval spacing. As a reference, a list of the standard interval and duration timing is:

	UNITS OF TIME	
	INTERVAL	DURATION
DIT (DOT)	.....	1 UNIT
DAH (DASH)	.....	3 UNITS
ELEMENT SPACE	1 UNIT	.....
CHARACTER SPACE	3 UNITS	.....
WORD SPACE	7 UNITS	.....

Again, this timing applies to WPM speeds at about 15 and greater and would be nothing but confusion at slower speeds.

For example: in standard timing at 5 WPM; consider the letter "S":

dit, space, dit, space, dit, space; I would **incorrectly** copy; E, E, E.

In Farnsworth timing at 5 WPM;

dididit, space, space, space; and I would **correctly** copy the letter "S".

Study Materials

LEARNING TAPES (LT)

To begin your studying, you will have to decide whether Option 1 or Option 2 (or a combination) is best for you. You will also need the prerecorded tapes described later.

OPTION 1

If you have a friend who is a Ham and is proficient with the code at the higher speeds, you can have him or her make the learning tapes for you. (Experienced CW operators should have no trouble putting together a couple of hours of practice tape in their spare time, over a period of a few weeks.) Bear in mind, whoever makes these tapes must adhere to the study program and the lesson/session format. Also, be sure to get a check sheet so that you can check your copy and progress. Minimum speed should be no less than seven WPM for Novice, 14-15 WPM for General and 22 WPM for Amateur Extra Class; using Farnsworth element speed at around 18 or more WPM. If your friend has access to an electronic keyer, he will be able to produce perfectly timed copy for your practice.

OPTION 2

If you have a computer, there are several excellent computer programs and tutorials available for you to use. These programs can replace the "friend" we talked about in Option 1. With these programs, you get to set the speed, weighting, element speed and spacing, etc. That is to say, you can tailor, or control, the program to follow this course of study. You may use these programs straight from the computer for each lesson, however this requires a menu setup each time. Or, you can have some fun making up learning tapes ahead of time. You might want to make tomorrow's tape right after today's session or you might enjoy putting together a package of lessons. Whether you study directly from the computer or from your home-made tapes, these will still be referred to as Learning Tapes (LT). Whatever you decide, be very sure that you are comfortable with your study schedule.

When shopping for a Morse Code computer tutorial, be sure to determine that the program has a menu option which allows you to pick and choose characters according to the lesson plans. Show the sales person the actual lesson outlines in this book to determine if, in fact, the program can be configured accordingly.

There are also "code-making" machines available, which do not require a computer to operate. They are small desktop units and vary considerably in features, functions and price. Like the computer programs, be sure that the device you examine is compatible with this study program.

A NOTE ABOUT OPTIONS 1 AND 2: If you do not know the code, that is to say, if you are working toward your Novice or Tech-Plus license; the home-made lesson tapes should have the character's name recited right after it is sounded (e.g.: you'll hear didahdit . . . "R" . . . didahdit . . . "R" . . . etc.).

See the section in the back of this Manual for information on ARRL (American Radio Relay League) code study materials.

It is important to hear the name of the character after the code sounds in order to keep your mind in a SUBJECTIVE mode. If the character's name was recited before the code sound, it would become an objective learning process, and you never want to fall into that trap!

If you do know the code characters and are going to be studying for 5, 13, 20 WPM, or higher, then it should not be necessary to have the character names vocalized on the tapes; although this shall remain your option . . . up to 13 WPM. After 13, no more talking – just solid Morse Code.

IF YOU ARE JUST STARTING TO LEARN THE MORSE CODE, *DO NOT MEMORIZE THE DOTS AND DASHES* FOR THE LETTERS, NUMBERS, PUNCTUATION AND PROSIGNS.

PRE-RECORDED TAPES Practice Tapes (PT)

There are many "Code Practice Tapes" available commercially. Not all of these will be suitable for your purposes. You do not want to get the so-called "Learning Tapes" where the narrator says a letter, then you hear **long-spaced** beeps. What you will need are the "Practice Tapes" which consist of typical on-air QSO's, plain-language copy and random groups. Tapes produced by the ARRL (American Radio Relay League) are excellent for this purpose. When purchasing tapes – and this is crucial – DO NOT BUY ANY TAPE WITH A CODE ELEMENT SPEED SLOWER THAN 18 WORDS PER MINUTE, FARNSWORTH. If the tapes happen to come as a package which includes a wide range of speeds, put aside anything slower than 18 WPM element speed, regardless of your code copy speed goal. Remember translation and instinct? Any code sent to you slower than at these double-digit element speed ranges will begin to train you to copy in a translative fashion. You want to copy instinctively so that you won't have to work at this. You want this learning process to come naturally.

I have placed 18 WPM as the lowest element study speed since that seems to be where the instinct/translation hump is generally bypassed. I encourage the student to begin at even higher speeds than 18 WPM Farnsworth, if possible. If this sounds too adventurous or you don't think you'll be comfortable "up-there," then stick to the outlined plan.

You can supplement some of your PT work with actual "off-the-air" copy. This can really be a lot of fun. You never know what the conversation (QSO) is going to be about, you will have to tune around and through all manner of atmospheric static, man-made noise and interfering stations, fading, ground flutter, etc. But, you'll feel like part of the action! You can also tune-in on stations like W1AW and copy the Bulletins AT 18 WPM. They also broadcast slow and fast practice code sessions. You may also want to tape record some of these transmissions for our PT work. (See W1AW Schedule in the Appendix.) However, I'll say it one more time: DO NOT LISTEN TO, OR TRY TO COPY, ANYTHING SPACED SLOWER THAN THAT MAGIC FARNSWORTH NUMBER, **18**; AT YOUR PRESENT GOAL SPEED!

Whenever you see "PT: LISTEN FOR THESE LETTERS, ONLY" in a lesson, this means to "copy" whatever characters you have just studied in the "LT" part of the session. Do not try to copy anything else even though you know what you have heard. There will be other lessons that will give you the opportunity to copy everything you have learned.

Just A Few Last Words

There is only one way you can begin to learn the code correctly: *You must fully understand everything you have read up to this point and be in the mental frame of mind that we discussed. You must be willing and feel eager to "get on" with the business of learning this language.* Remember, if you already learned the code for your Novice or Tech-Plus class license, you're now going to relearn it by sound, not dot and dash, so that you can progress up and through the ranks of Amateur Radio.

A WORD OF CAUTION: IT MAY BE VERY TEMPTING, ESPECIALLY IN THE BEGINNING, TO "SCOOT" THROUGH THE LESSONS. DO NOT DO IT! YOU WILL BE DOING A GREAT DISSERVICE TO YOURSELF. MOST OF THE TIME, WHEN STUDENTS "SAIL" THROUGH LESSON AFTER LESSON, IT EVENTUALLY CATCHES UP WITH THEM. THIS ALL TOO OFTEN LEADS TO DISCOURAGEMENT OR EVEN FAILURE WHEN THE STUDENT JUST GIVES UP IN DESPERATION. STICK TO THE LESSON PLAN AND INSTRUCTIONS.

OK, LET'S BEGIN. Instruct the computer program or code machine to send the characters in the following lessons RANDOMLY and at about 18 WPM element speed with spaces between letters and words (not elements) increased to slow down the overall copy to 14/15 or 7 WPM, depending on your goal speed. (If you are studying for 20 WPM, use standard timing.) If your program or code machine does not have this flexibility to facilitate the lesson structure, you will have to use the tapes made for you as discussed in the first option. Note that this fast element/long-space system (Farnsworth method) gives you the "total" sound of each letter. You are not going to hear; dit . . . dit . . . dit. You will hear the complete letter; dididit.

NOTE: Lessons 1 through 24 contain text in UPPER and lower case type.

THE UPPER CASE TEXT GIVES INSTRUCTIONS AND DIRECTIONS.

The lower case text contains hints and explanations.

Do not be in a hurry to go through the 24 Lessons.

Good Luck . . . Now, let's get started.

LESSON 1

IN THIS LESSON, WE ARE GOING TO LEARN FOUR LETTERS AND ONE NUMBER.

LT:	E, I, S, H, 5; random.	1 min. sessions.
PT:	NONE	

LESSON 2

IN THIS LESSON WE ARE GOING TO LEARN THREE LETTERS AND ONE NUMBER.

LT:	T, M, O, 0 (zero); random.	1 min. sessions.
PT:	NONE	

LESSON 3

IN THIS LESSON WE ARE GOING TO REVIEW SEVEN LETTERS AND TWO NUMBERS. THAT'S RIGHT; ALMOST ONE-THIRD OF THE ALPHABET AND ONE-FIFTH OF THE NUMBERS!

LT:	E, T, I, M, S, O, H, 5, 0 (zero); random.	1 min. sessions.
PT:	LISTEN FOR THESE CHARACTERS.	3 min. sessions.

LESSON 4

THIS LESSON CONTAINS FOUR LETTERS THAT HAVE REVERSE SOUNDS.

LT:	U, D, W, G; random.	1 min. sessions.
PT:	LISTEN FOR THESE LETTERS, ONLY.	3 min. sessions.

LESSON 5

RECAP.

RE-TEST YOURSELF ON LESSONS 1, 2, AND 4. THREE ONE-MINUTE SESSIONS. LISTEN TO PT FOR THREE MINUTES. SEE HOW MUCH YOU CAN COPY.

LESSON 6

MORE REVERSE SOUND LETTERS.

LT: A, N; random. 1 min. sessions.
PT: LISTEN FOR THESE LETTERS ONLY. 3 min. sessions.

LESSON 7

AND MORE REVERSE SOUND LETTERS.

LT: K, R; random. 1 min. sessions.
PT: LISTEN FOR THESE LETTERS ONLY. 3 min. sessions.

LESSON 8

YOU ARE NOW WELL PAST THE HALF-WAY MARK; ABOUT 60%! SET YOUR PROGRAM TO TEST YOU ON WHAT YOU HAVE LEARNED.

LT: A, D, E, G, H, I, K, M, N, O, R, S, T, U, W, 1, 0 (zero); random.

STUDY THIS LESSON UNTIL YOU CAN COPY 85%-90%

DO NOT EXTEND ANY SESSION PAST THREE MINUTES. IF, AFTER THREE OR FOUR TRYS, YOU FEEL THAT YOU MIGHT HAVE PROCEEDED TOO FAST, GO BACK AND DO #1, 2, 4, 6 OR 7. YOU ARE THE ONLY JUDGE QUALIFIED TO DETERMINE YOUR PROGRESS. DON'T GET DISCOURAGED; IF NECESSARY, GO BACK AND REREAD SOME OF THE EARLIER SECTIONS ON **COMMITMENT, DETERMINATION** AND **DISCIPLINE**.

LISTEN TO PT, ON-THE-AIR CONVERSATIONS (QSO's), OR A.R.R.L. BULLETINS AND CODE PRACTICE SESSIONS. LISTEN AND COPY WHATEVER YOU CAN WITHIN YOUR LOWER FARNSWORTH SPEED LIMIT. DO NOT PROCEED UNTIL YOU ARE COMFORTABLE WITH WHAT YOU HAVE STUDIED THROUGH LESSON 7.

LESSON 9

LT: B, J; random. 1 min. sessions.
PT: LISTEN FOR THESE LETTERS ONLY. 3 min. sessions.

LESSON 10

LT:	F, L; random.	1 min. sessions.
PT:	LISTEN FOR THESE LETTERS ONLY.	3 min. sessions.

LESSON 11

LT:	C, P; random.	1 min. sessions.
PT:	LISTEN FOR THESE LETTERS ONLY.	3 min. sessions.

LESSON 12

REVIEW ALL PREVIOUS CHARACTERS. RE-PRACTICE THE LESSONS WHICH CONTAIN ANY LETTERS THAT ARE NOT INSTANTLY RECOGNIZABLE WHILE COPYING.

LISTEN CAREFULLY, BUT RELAXED. COPY DOWN ANYTHING AND EVERYTHING YOU RECOGNIZE. DO NOT TENSE-UP AS THOUGH THIS IS A DO-OR-DIE CONTEST. PLAY THE (PT) TAPE-RECORDED MATERIAL, LISTEN TO A.R.R.L. BULLETINS AND ON-AIR QSO'S. DO NOT HESITATE TO GO BACK AND PLAY ANY OR ALL OF THE LT'S. DO NOT PROCEED UNTIL YOU CAN COPY AT LEAST 85% OF ALL THE MATERIAL COVERED THIS FAR. *BE PATIENT WITH YOURSELF.*

You have reached a critical part of the program. Understand that at this point you are literally more than 80% of the way through the alphabet. In a practical sense, you are actually farther along than that because the remaining letters are less used than those you have already learned.

What's left to learn? Well, you have Q, V, X, Y, and Z for the remaining letters, eight more numbers, some punctuation, and a few prosigns. In terms of overall effort, you are about two-thirds through the course. When you look back, it probably doesn't seem so bad from this perspective. Go to your copy notebook. Look at that first sheet. Flip through the pages. The progress you have made should be very reassuring.

The remaining five letters usually require a little extra practice in order to get them instinctively. The numbers are very orderly and will go quite quickly in three lessons. Prosigns and punctuation each have their own unique and distinct sound and can be learned without too much effort.

LET'S CONTINUE . . .

LESSON 13

LT:	Q, Y; random.	1 min. sessions.
PT:	LISTEN FOR THESE LETTERS ONLY.	3 min. sessions.

LESSON 14

LT:	V, X, Z; random.	1 min. sessions.
PT:	LISTEN FOR THESE LETTERS ONLY.	3 min. sessions.

LESSON 15

This is the lesson where you get to do whatever you want to do! Write down everything that you hear and recognize. This time you will play the PT's, listen in on the Ham bands or maybe have a qualified friend "send" some code to you. You get great freedom in this lesson to do whatever you think is beneficial to your program. You have learned enough of this skill to have earned the right to be responsible for your own analysis of your strong and weak points. Only YOU can help you now. You have more freedom, more authority, but along with that comes more responsibility. You are becoming more "Teacher" and less "Student."

LT, PT: ANY COMBINATION. Max. 5 min. sessions.

LESSON 16

We are now going to study numbers. You already have heard the sounds of 5 and 0 (zero). As mentioned at the end of Lesson 12, the numbers are very "orderly" in their code format. However, played at the higher speeds, it could be easier to make an error with numbers than letters. This is due to the fact that their format is so linear and that some adjacent numbers sound almost alike.

When you are listening to numbers, you should train yourself to hear two distinct patterns within the total sound of the number. That is to say: a number in Morse Code actually reveals itself two times; first in the dits, then again in the dahs or vice-versa. At this point, it will be very easy to form a bad habit – counting elements: **Always fight the urge to "count" the elements.** Although by counting the dits and dahs, you will get two chances to copy the number correctly, it will not work at the higher double-digit code speeds. It is a bad trap to fall into. Now is a good time to remember "translation" and "instinct." Counting is translation, sound characteristics are instinctive.

LT:	1, 2, J, W random.	1 min. sessions.
PT:	ANY.	3 min. sessions.

LESSON 17

LT:	6, 7, B, D; random.	1 min. sessions.
PT:	ANY.	3 min. sessions.

LESSON 18

LT:	3, 4, F, V; random.	1 min. sessions.
PT:	ANY.	3 min. sessions.

LESSON 19

LT:	8, 9, Q, Z; random.	1 min. sessions.
PT:	ANY.	3 min. sessions.

LESSON 20

PLAY LESSONS 16 THROUGH 19 AND LISTEN TO YOUR PT RECORDED MATERIAL, BULLETINS AND QSO'S. REPEAT THIS LESSON AS MANY TIMES AS NECESSARY UNTIL YOU CAN COPY 85%-90% CORRECTLY. THIS LESSON MAY BE THE TOUGHEST ONE YOU'VE DONE SO FAR. DO NOT MAKE WORK OUT OF IT! PRACTICE IN SESSIONS OF FIVE MINUTES OR LESS. PRACTICE AS OFTEN AS YOU LIKE. TWO OR THREE SESSIONS EACH DAY IS GOOD, BUT SIX OR SEVEN IS BETTER.

Don't be discouraged if this one takes several days or even a week. This block of 16 characters is a very comprehensive one since it demonstrates your ability to hear the differences between letters and numbers. Stay with it and look forward to the confidence you will have in knowing you can copy mixed letters and numbers.

Remember: numbers count as two characters on your code exam.

LESSON 21

PUNCTUATION

LT: QUESTION MARK, COMMA, PERIOD; (?), (,), (.); random. 1 min. sessions.

We will cover all three of these punctuation marks in the same lesson because it is important to hear and know their characteristic sounds. LEARN AND KNOW THESE MARKS 100%. Don't forget: punctuation counts as two characters on your test QSO.

PRACTICE ALL OF THESE MARKS IN RANDOM ORDER IN ONE-MINUTE SESSIONS. REPEAT THIS LESSON UNTIL YOU KNOW THE THREE PUNCTUATION MARKS.

LESSON 22

PROCEDURAL SIGNS (PROSIGNS)

LT: AR, SK, BT, DN; random. 1 min. sessions.

AR: End of message, ("over").
SK: End of work. ("clear").
BT: Break or pause, ("hold, wait, standby").
DN: Slant bar, fraction bar, ("stroke" or "slash").

PRACTICE THESE PROSIGNS IN RANDOM ORDER IN ONE-MINUTE SESSIONS. REPEAT THIS LESSON UNTIL YOU KNOW THE FOUR PROSIGNS.

LESSON 23

RECAP: PUNCTUATION & PROSIGNS

TEST YOURSELF BY REPLAYING LESSONS 21 AND 22. REALIZE THAT YOU HAVE JUST DONE A LITTLE BIT OF "CRAMMING" IN LEARNING LESSONS 21 AND 22. IT IS QUITE COMMON TO FORGET SOME OF THE PUNCTUATION SOUNDS AFTER LEARNING THE PROSIGNS. THIS IS THE PERFECT TIME TO PLAY THESE SEVEN SOUNDS UNTIL YOU CAN COPY THEM AT LEAST 95% DURING ONE-MINUTE SESSIONS. REPEAT THIS LESSON AS OFTEN AND AS MANY TIMES AS NECESSARY UNTIL YOU ARE COMFORTABLE WITH THE ACCURACY OF YOUR COPY.

Do not overdo it. Three to five (or even seven) sessions, well spaced throughout the day, is plenty. Trying to learn these seven sounds too quickly can lead to confusion and frustration; it can actually drive you backwards in your progress.

LESSON 24

This lesson is the analysis of your comprehension and progress of the entire program. You will now find out your areas of strength and weakness. This is not meant to be a test, but rather an indicator of what must be reviewed in order to maintain a reasonable linearity throughout the program. Simply put, you are the teacher as well as the student . . . You will determine the areas that need work . . . It is up to you now . . . Analyze your capabilities and work on those areas that need it.

PT: NOTICE THAT WE ARE BEGINNING WITH THE PRACTICE TAPES FIRST. THAT'S BECAUSE THERE IS LITTLE OR NO "LEARNING" TO DO.

At this point, most students will feel that they have not learned all of the 43 sounds. Nothing could be further from the truth! If you have followed the lesson instructions in this course, you have **LEARNED** all 43 sounds. It is perfectly normal and natural to **FORGET** some or many of them; that is why we have Lesson 24. Now is the time to review everything you have learned and **REMEMBER** the forgotten sounds.

PLAY THE PT MATERIAL, LISTEN TO CODE ON THE RADIO AND TUNE-IN THE A.R.R.L. BULLETINS AND CODE PRACTICE SESSIONS. TRY TO COPY EVERYTHING YOU HEAR. TRY TO COPY AT SPEEDS MUCH HIGHER THAN YOUR GOAL SPEED. DON'T DWELL ON MISSED CHARACTERS . . . JUST WRITE EVERYTHING THAT YOU HEAR.

DO THIS TYPE OF COPY FOR THREE TO FIVE DAYS. AT THE END OF THAT PERIOD, GO TO YOUR COPY SHEETS AND LOOK FOR THE 43 THINGS THAT YOU HAVE LEARNED. DETERMINE WHAT YOU HAD TROUBLE WITH AND WHAT YOU MISSED ALTOGETHER. MAKE A LIST OF THESE PROBLEM CHARACTERS AND GO BACK AND DO SEVERAL SESSIONS WITH THE APPROPRIATE LESSON. THEN, RETURN TO LESSON 24 AND DO IT ALL OVER AGAIN.

This should really be the fun part. Go back through all of your copy papers . . . just look at your progress!!! What you are doing now is polishing-up your skills. Each time you test yourself with this lesson, you will find an area that needs honing. GO BACK AND SHARPEN YOUR MORSE CODE COPYING SKILLS IN THOSE AREAS THAT NEED IT; AND AGAIN RETURN TO THE LESSON 24 FORMAT.

If you are not presently licensed to go on the air and actually practice code in a real QSO, you can send to yourself with a code practice oscillator and your tape recorder. It will be fun copying everything you have sent. It will also demonstrate to you just how good your sending "fist" really is. If your sending is choppy or your dits, dahs and spacing need timing adjustments, now is the time to work on that, also. Maybe a friend would like to send to you from across the room while you copy. Then, you can take turns sending and receiving. You would be surprised how good this kind of practice can be for your INSTINCTIVE copy!

If you are already licensed and using this course to upgrade to a higher class, then please, do yourself a favor; GET ON THE AIR! You can also do what I described in the preceding paragraph for fun practice; but, by all means, bear in mind: nothing beats on-air QSO's for the best all-around practice to improve code speed proficiency.

Well, Congratulations. That's it! If you have carefully read and understood all of the instructions, been totally honest and fair, and not too hard on yourself, then you probably feel pretty good about your achievements; having come so far in not-so long a time. That's great. However, despite all that terrific progress, if you feel like you are not quite as comfortable with the code as you should be – if you have the feeling that this is not over yet – that you should be comfortable sending and receiving code at some higher speed – if somehow this whole endeavor seems somewhat anti-climatic. . . then, you are quite normal. It is very common for you to feel a little "let-down." At the beginning, you might have thought that getting successfully to the end of a code course would be cause for celebration. Welcome to the world of telegraphy, where there is no end, just plateaus of proficiency. Be content but not satisfied. Right now, you deserve a little reward. Have some fun. If you haven't done what I just told you to do, do it now; go back to the very first few pages of your copy. Put it all back into perspective. We have been concentrating on being subjective for so long, it should be a little difficult to be objective about anything concerning the code. Go ahead, you're allowed to be objective occasionally. Look at those early copy sheets. You will then have a good overall picture of how far you've come. Want some more fun? Play one of those early tapes. Remember how it used to be? That should really put things in perspective. Stay with the code. No matter what your code speed goal was, now that you've reached it, go on. Just because you got your license or successfully upgraded, don't stop. You would just be doing a great disservice to yourself. Keep at it. Get more comfortable. Get faster. Become more accurate. Keep going. Remember; it's a language: learn to use it well. . . and also remember; it's not work: have fun.

Have fun and **ENJOY** your practice. Your speed capability will increase faster than you realize. You'll actually have to be tested to know how fast you really can copy. I think you'll be pleasantly surprised.

I WILL REPEAT WHAT WE SAID IN THE BEGINNING OF THIS COURSE:

DO NOT BE IN A HURRY
TO GO THROUGH THE 24 LESSONS!

Problems And Troubles

There is no "average" time for completion of this program. Many factors enter into this consideration: your daily schedule of sessions, the type of LT and PT you have available to you, whether or not you have to make your own tapes, the number of Ham friends you have nearby who are "code proficient" and willing to spend some time making tapes for you and finally "you." If you feel that congratulations are not in order for you just yet, reread Lesson 24. If you still have some trouble with that lesson, ask yourself a few basic questions;

1. Have I maintained a good daily schedule for my sessions?

2. Have I remembered those three qualities of **COMMITMENT, DETERMINATION** and **DISCIPLINE**?

3. Have I tried to speed through one lesson after another?

4. Has my mind been on my work or did I just very "mechanically" go through a session or two. *[Just "being there" is not enough; if you think that might have happened, reread "LESSONS AND SESSIONS."]*

5. Did I thoroughly understand all of the concepts described in the text prior to beginning my code practice?

6. Have I been honest with myself? Have I been fair to myself? Did I rush through some lessons? Sessions? Did I push too hard or demand too much of myself? Did I "squeeze-in" some sessions?

A FINAL WORD: Everything you need to know is contained in this course. If you have experienced difficulties in getting up to the entry level code speed or to your upgrade speed, chances are very good that additional practice is all you will need. In most cases, that is all that is lacking in achieving the desired goal.

Part IV: The Exam

Taking The Exam

When test day arrives, there are a few things you can do to give yourself the maximum advantage.

We have already discussed mental block and its three main causes. These causes are bad habits and as for taking the exam while still practicing these habits, they become your worst enemy. The day of the exam: Don't cram! Avoid mental fatigue and possible mental block. Do several light practice runs during the day. Make them no longer than five to six minutes each and space them out to one or two hours between sessions. Allow at least one hour between your last practice run and the test session.

Check your paperwork. Make sure you have all the required applications, forms and copies. The paperwork requirements will vary slightly between VETs. If you are not sure what you will need, contact one of the session VEs to confirm the requirements. Be sure you have a couple of sharp pencils and a ball point pen. Hard candy or chewing gum might help a dry mouth or burn-up that little bit of nervous energy.

Occupy your mind with your work or other activities. Don't dwell on the upcoming exam. Do not project your thoughts into what the exam "might be like." Don't allow yourself to get worked-up. Despite the advice of some well-meaning individuals, getting "psyched" is not the way to approach an exam. If you feel yourself getting tense, do something to relax. Go about your chores or read a book; keep your mind occupied.

Eat a light meal before leaving for the test session. Avoid alcohol and don't overdo sugar and caffeine.

When you enter the test site, go about your registration business in a calm and methodical fashion. Engage in light conversation with friends or other applicants.

Listen carefully for instructions from the VEs. Do exactly what is asked of you: no more, no less. The VEs are volunteers. They receive no payment for their services and they have more work to do than you might imagine. Cooperating with them will make the session go smoothly for both you and the VEs.

Remind yourself: This is a hobby. This has nothing to do with your occupation or schooling. Your pay or grades are not affected by this exam. If, for some reason, you have difficulties, remember: there is always next week or next month.

Required Characters: Code Test Lesson Reference

The following characters are the minimum that you are required to know for your code test. There are additional prosigns and prowords (see Appendix) but you are not required to know them for your test. All the required characters have been covered in the lesson portion of this book.

1. Alphabet: .....26 letters

2. Numbers: .....0 through 9

3. Punctuation: .....period, comma and question mark

4. Prosigns: .....AR: Over, end of message
   SK: Clear, end of work
   BT: Pause, break
   DN: Slant Bar, "stroke"

   Note: DE will usually be used on your test.
   DE means "from" or "this is."

- All prosigns are sent as one character, i.e. one element space instead of three character spaces.

- Prosigns, punctuation and numbers count as two letters on your test.

Test-Taking Hints

PROMPTS: TIP-OFFS, TRIGGERS AND INFO WARNING SIGNS

During a typical QSO, whether it be code practice, a code test or an actual on-air contact, there will be a series of "Prompts" which will "Warn" you that important information is coming and should "Trigger" you to copy very accurately. These prompts must be learned by sound. Under no circumstances should you look for these "tip-offs" in your copy while you are actually copying! Nor should you anticipate their approach. Learn and listen for the key prompts. You will actually be copying words! It is quite easy to learn. If you haven't already noticed in your code practice, there are a few words that are used over and over again. Usually, but not always, they will begin a sentence. The most common of these words to be found on a typical code test are:

The • My • Your • I

When you hear the sound of a prompt, you should automatically be alerted for some important information.

Some typical sentences might be:

"The weather here is . . ."
"The name here is . . ."
"The temperature (temp) here is . . ."
"The QTH is . . ."
"My QTH is . . ."
"My name is . . ."
"I am . . . years old"
"I like to . . ."
"I have a . . ."
"I have been hamming for . . ."
"My rig is . . ."
"My antenna is . . ."
"My occupation is . . ."
"Your RST is . . ."
"I must QRT now for . . ."
"My age is . . ."
"I work for . . ."
"I am . . ."

Again, learn and know these word sounds. Make yourself a tape and practice copying them until you know the sounds instinctively. Say them to yourself while going about your daily routine: dahdah-dahdidahdah . . . "my"; dah-dididit-dit . . ."the"; etc.

As we have discussed, looking for these words in your copy will tend to confuse your brain, which has been operating in subjective mode, and very likely cause it to switch over to "reading" or objective mode. Try to avoid this at all cost. Besides, it takes time to read; time that might cause the loss of some valuable information that you might otherwise have copied. Reread numbers 6, 7, & 8 under "ADDITIONAL STUDY HINTS." Make clear to yourself the difference between prompts and guessing.

Typical Test Questions

In the section on "TIP-OFFS, TRIGGERS, AND INFO WARNING SIGNS," we looked at the way a typical QSO sentence begins in order to learn the prompts and their unique sounds. Now we will look at the same type of sentences and some typical information you will be expected to know from your copy for the test answer sheet.

The sending operator's call sign
The receiving operator's call sign
At the beginning and end of the test QSO, you should copy the two stations' call signs. If you miss part of one of the calls, you will have a second chance at the end of the QSO. The first call sign will be the receiving station's call and the second call sign will be the sending station's call. They should be separated by the prosign "DE" meaning "this is." Also, be alert for a possible Slant Bar followed by a number, in one or both call signs.
The receiving operator's name. This name will usually be preceded by:
"TKS (TNX) for the call . . .", or TKS (TNX) . . . for the call", or some similar wording.
The transmitting op's name. He or she will usually say,
"My name is . . ." or "The name here is . . ."
Sender's age
"My age is . . . " or "I am . . . years old"
RST report.
"Your RST is . . . " Be ready to copy three numbers. "589, 599, 479," etc.
QTH. The sending Op will tell you where the transmitter is located.
"QTH here is . . . " (Usually city and state).
Type of rig or other equipment and usually the transmitting power in watts.
"My rig is: "Kenwood TS830S running 90 watts." or " . . . ICOM 735 running 60 watts"
The type and height of the antenna.
"My antenna is 80 meter dipole" or maybe "Monoband Yagi up 60 feet."
Weather report.
"The weather here is: or "WX here is . . ."Hot and humid", "Cold and raining," etc.
Temperature.
"The temperature is: "78 Degrees", "42 Degrees".
Sending Op's occupation.
"I work for . . .", "My occupation is . . ." Then: Engineer, Teacher, Carpenter, School Bus Driver, etc.
How long he or she has been hamming.
"I have been hamming for . . . years.", "I have been a ham for . . . months."
Hobbies.
"I like to . . .," "My hobby is . . . ": boating, hiking, stamp collecting, etc.
License class.
"I am a . . .," "I have a . . . class license." There's only six of them. Look for a letter pattern.
Reason for QRT.
"Must QRT now for . . ."; dinner, walk, bed, etc.

Notice how the Prompts (see the Prompts section) will fit into the QSO. Listen carefully for the sounds of these Prompts. Notice that there is time between the prompt and the needed information. As you can see in the examples above, words like "as, is, a, here, have, going," etc. provide the preparation time between the prompt and the information needed for the answer sheet.

Copy Techniques: Printing, Longhand and Ciphers

We have already discussed here some of the things that will help you in your practice. Now we will look at some things to do and some good habits to form to help with your actual test.

A question that almost always arises concerns the ability to write at the same (or faster) speed as the test. Over the years, it has been suggested that if you have trouble "printing" at that particular speed you should try to get into the habit of "using longhand." Using longhand vs. printing has its good and bad points. Both methods should be tried. Some students cannot use longhand even at the slowest speeds. It is believed that this is due to the fact that code is heard in a sort of digital fashion: that is, groups of individual characters. Therefore, it may become difficult to maintain the "flow" continuity of longhand as your brain is processing these individual pieces of data. On the other hand, many students complain that they "Just can't keep-up with the code while printing." If this is the case with you, then you should try longhand. In either case, remember, neatness is not going to contribute to your final grade. If you find that you can keep-up with the code by printing faster, but a little sloppier, then do it. The only thing you must keep in mind is that **you** have to be able to read your own copy in order to answer the questions. Additionally, your copy should be legible enough for the Volunteer Examiners (VEs) to look for one minute of perfect copy.

Ticks - Ticks - Ticks

Remember not to dwell on any missed character. If you are not sure of what you heard, quickly put a "tick" mark where the letter should be. You will have time later to figure out what it was. Some examples might be: "What was the receiving operator's name"? And all you can find is, "*o*ert" or maybe "*i*l*am." Do you see Robert and William in there? How about: "What type of antenna is at the transmitting station's QTH"? Your copy sheet shows, "Y**i" or possibly "*ip*le." Can you make Yagi and Dipole out of that copy? What about: "I hold an *dvanc** class license"? Not novice, technician, tech plus, general or extra.

Remember, don't get worked-up because you feel that you must get perfect copy in order to answer the questions. Some candidates have passed their exams with as little as 80% copy. You just have to be pretty good at filling in the missing letters. Of course, if you do get perfect copy, you won't be judged by your answer sheet score, anyway!

Ciphers: Dots and Dashes

A frequently asked question concerns the use of ciphers during a test. The use of ciphers or writing the actual dots and dashes is usually the result of a mental block. It is really up to the Volunteer Examiner Team (VET) whether this is allowed or not. In terms of instinctive copy techniques, I strongly discourage the use of ciphers. If something really important was missed and you recall the sound of the character, then you may want to quickly scratch out the actual dots and dashes. Again, some VEs frown on that kind of copy and I really don't endorse it either. However, if they allow it and it gets you another correct answer, well . . . you decide.

Learn to make STUDY HINTS 1, 6, 7, and 8 second nature. They are good habits to practice!

Finding Answers

We are frequently told by students that one of the most perplexing portions of the exam is reading one's own copy sheet. This is also painfully apparent to the VEs who are looking for one minute of perfect copy. We already discussed longhand vs. printing. It is up to you which one (or both) will afford you two things: getting the data that you are listening to on the paper as quickly as it is being sent, and being able to read what you wrote.

Depending on the VET's policies, you may or may not be allowed time to make corrections to your copy sheet before you are handed the answer sheet. If you are not allowed time, you probably can make corrections while you are filling in the blanks (or selecting from multiple choice answers) on your answer sheet.

Look at your copy; look for clues. Try to fill in the blank spaces or where the tick marks are. Reread "COPY TECHNIQUES" if necessary. Look for places where words run together. Many times the student has copied the correct information, yet fails to answer the question on the answer sheet. Why? Because the word that he is looking for is hidden in and amongst other words which are all run together. Two of the very most important things to try to do on your copy sheet are: proper word spaces (as we just discussed) and not missing the first letter of a word. The first letter of a word is the key letter. It is usually many times more important than any subsequent letter. Which is easier to decipher; "S*attle" or "**attle"? If one of the questions asked for " . . . the transmitting station's QTH in the state of Washington," wouldn't you be able to decipher the first example easier than the second?

Take your time reading the copy sheet: Again, look for the clues! Think about the order of a normal QSO. Look again at the section on "TEST-TAKING HINTS" and "TYPICAL TEST QUESTIONS." The flow of the test QSO should be very similar to an actual on-air QSO.

Of course, these tips are not just for taking code tests; these techniques are used by experienced Hams all over the world every day!

Remember, no matter how proficient you are at receiving Morse Code, there will always be an operator "out there" who is faster. Or, what if the other Op isn't faster, just sloppy? These copy techniques will help you decipher his transmission. Study them!

Exam Requirements And Test Scores

EXAMINATION ELEMENTS

License Class	Written Exam Elements	Code Exam Elements
Novice	2	1A
Technician (1)	2, 3A	none
Technician Plus (2)	2, 3A	1A
General	2, 3A, 3B	1B
Advanced	2, 3A, 3B, 4A	1B
Amateur Extra	2, 3A, 3B, 4A, 4B	1C

WRITTEN EXAMINATION QUESTION POOLS*

ELEMENT	LICENSE CLASS	QUESTIONS IN POOL (3)	QUESTIONS ON EXAM	MINIMUM CORRECT	MAXIMUM ERRORS	PASSING SCORE
2	Novice	346	30	22	8	73%
3a	Technician (all)	295	25	19	6	76%
3B	General	290	25	19	6	76%
4A	Advanced	497	50	37	13	74%
4B	Amateur Extra	432	40	30	10	75%

MORSE CODE TEST*

ELEMENT	TO OBTAIN LICENSE	CODE SPEED (WPM) PLAIN LANGUAGE	TEST QUESTIONS	ERRORS ALLOWED	PASSING GRADE (4)
1A	Novice / Tech Plus	5	10	3	70%
1B	General / Advanced	13	10	3	70%
1C	Amateur Extra	20	10	3	70%

NOTES:

(1) "No-Code" and "Codeless Technician" are the same.
(2) "Tech-Plus" and "Technician w H/F" are the same.
(3) Total pool questions may change with pool reissue.
(4) See, "One-Minute Perfect Copy."

* The information presented here is based on ARRL–VEC and/or FCC guidelines as of this writing and is subject to change. Formats for written exams and code testing vary between Volunteer Examiner Coordinators (VECs) and Volunteer Examiner teams (VETs), e.g.: multiple choice, blank fill-ins, structure of code test, etc. Check with your local VET for details.

One-Minute Perfect Copy

In the event that you did not score a passing grade on the written portion of the code test, the Examiners will look for one minute of perfect copy (solid copy). This means that they will be checking your copy to determine if it is the same as the code sent to you. This will include letters, numbers, punctuation and prosigns. The numbers, punctuation and prosigns will be counted as two letters each. The copy can come from anywhere in the test QSO but must be one minute of continuous copy.

A PASSING COUNT WILL BE AS FOLLOWS:

5 WPM	25 characters
13 WPM	65 characters
20 WPM	100 characters

You should already have made some corrections and fill-ins on your copy sheet in order to find answers to the questions on your test paper. Before you turn in your copy sheet, read it very carefully. Read it again. Do you have a tick mark where a comma should be? Did you miss a period or question mark? How about the prosigns? Have you misspelled a word?

Take all the time that you need or that the Examiners will allow. Remember, this was just an ordinary QSO; nothing fancy, nothing tricky. This QSO should have been just like the ones you've heard on practice tapes, from the computer or off-the-air. Many times, that one minute of solid copy is broken by a simple error in copying or copy correction. Check it . . . read it . . . check it . . . and read it again.

Good Luck

"I wish you good luck." "I'm going to need some luck." "I hope I'm lucky." "Wish me luck." "I feel lucky."

Yes, you can attain some goals with good luck. But, what is luck? Think about it. *Luck is being prepared for a situation.* Students don't get lucky at test sessions; they are just more prepared than they think they are. Oh sure, you might guess at something and just by chance get it right. That's not luck; that's coincidence. But don't expect to get your upgrade that way! I'll say it again; *luck is being prepared for a situation – when preparation meets opportunity.*

The "opportunity" is the exam you are going to take at your local test session.

Being prepared is having read and fully understanding this course. It is also doing all of the lessons in the manner proscribed. It is remembering the qualities of Commitment, Discipline and Determination. It is seeking help when you feel the beginnings of frustration or discouragement. There is a lot of guidance, inspiration and direction given in this book. If you start to get into trouble, find the section or page that relates to your condition and reread it. You will not be the first person to read this material. Everything here is the result of our instruction and counseling of individual and classroom students. Only after being used successfully and tested by time and results was it collected and put into book form. If you can't find the direction or consultation that you think you need, see one of your Ham friends or talk to someone at a local club. That is how to be prepared; do everything in this paragraph as it applies to you during and after your studies.

And, oh yes, good luck!

Exam Safety

That code speed safety margin we discussed in "A FEW TOUGH TESTS" is a very good idea. At the test session, you might feel just a little apprehensive or anxious because you are testing in a public place full of strangers instead of your home or club house where you learned to feel comfortable. Forget about it. Your confidence should more than make-up for slight nervousness or a little bit of the jitters. Don't forget, most test candidates at the exam can't copy 100% at the prescribed speed for which they are testing. A few are over trained and some are really not ready at all. But, if you are comfortable with your copy accuracy at a code speed that includes a little safety margin, then you are ready! You should be confident that you are going to leave the session successful. Hold your head high and walk proud; *feel victorious the moment you enter the door.*

Positive Thought

Remember what we talked about in "TAKING THE EXAM"; when you enter the testing registration area, relax, feel confident; you know *you* are ready for the test. Look around the room, see if you can spot any familiar faces. Are there eight people testing today? Or is this a larger session of about 15 people. Maybe you are at a Hamfest test session; there might be 25 or more test candidates there. Look at them. Do some appear nervous, fidgeting with their paperwork, shuffling their feet, eyes darting here and there? Smile confidently, *you* are ready. Watch the Volunteer Examiners; notice the methodical way in which they go about their duties. Don't they seem like friendly folks? What is the general mood in the room? Is the atmosphere a little solemn, anxious or apprehensive? Maybe a little for some, possibly a little more for others. But, *you* are the observer; *you* can see, recognize and make mental notes of all the activities. Are *you* a part of the goings-on? Sure, but *you* are not self-involved; *you* are not all wound-up in yourself with the negative emotions associated with self-doubt, uncertainty and reservations. *You've* done well in your studies, prepared in a methodical manner for this day and are in control of *your* own destiny. Take your time. Don't anticipate or project into the future. Don't be in a hurry to get things done before they can be done. Anticipation is worrying about the future; something you can prepare for but can't always control. Don't waste your energy and sacrifice a positive frame of mind for something you cannot totally manage or supervise. Enjoy this experience. It is a great confidence builder. *You* really know who you are, what you are made of and what makes you work. This might even be a little revelation for you. *You* should have a very positive attitude; not just about this test, but about *yourself* in general. *You* should feel masterful; whatever you touch, you control. You set your sights on something and hit the target; any and every time you wish. When *you* want something, *you* go after it and *you* know you are going to get it. Why? Because *you* really want it; *you* worked for it; *you* deserve it and *you* just have to have it. It should and will belong to *you*. So, relax, observe, don't think ahead, be alert and only concern yourself with what's happening now. *You* are in command. *You'll* be just fine.

Part V: Inspiration

The Future, Present and Past

THE FUTURE IS NOW!

That is exactly how you have to think. Envision yourself in the future. Not too far away, but maybe just beyond the next step. You should feel a sense of accomplishment, of pride and excitement. Of course, you can't live in a fantasy world, but you should train yourself to go there occasionally and feel the emotions that come with success.

Are you studying for your Novice exam? Maybe you can see yourself making that rare, elusive DX contact on 40 meters CW. Or possibly just doing a casual rag-chew on 10 meters locally, explaining to a friend how learning the code wasn't so bad after all. Think about it sometimes. It's a good positive exercise.

Maybe you are after your General ticket and can easily see yourself with all of the basic band privileges. You feel terrific. You have eight HF bands plus 160 meters to use in any mode allowable. Previously, you have made many CW contacts on 80, 40 and 10 meters. You have worked local stations and skip DX on 10 Meter phone. Now the whole world of Amateur Radio has opened up to you. General class is a great place to be!

Suppose you hold a General, Advanced, or Amateur Extra class license and really want to become a full-fledged Volunteer Examiner. You feel a deep obligation to "give back" something to the Ham community. You want to administer at test sessions and maybe give a class on code or theory. Feels good, right?

Okay, back to reality. That "really" was you out there. The only thing between here and there is time. Just a little time in which to apply some effort. But it really was you!

No matter what your last step was, your next step – the future – can, and should, be yours.

IS THE PRESENT REAL?

We don't have to think about the future to fantasize; most people, all too often, do it in the present. If you have ever gotten stuck at a particular level or hit a plateau in your studies and thought you weren't making progress and felt as though the whole thing was getting stale, then you were living a fantasy. Advancement in any program, is at best, a convoluted chain of ups and downs. This can be described by the following two conditions:

CONDITION ONE: There will probably be certain days when you feel as though little has happened in your studies; you absorbed almost nothing; you haven't improved your skill at all (or so you think).

CONDITION TWO: There will be days when nothing can stop you; you sail through everything you attempt. No matter how you approach your session, you seem to get to the end of it as if by magic.

It sounds as though you can expect good and bad days. Well, sort of. Don't be misled by what you may consider as a bad day, it may in fact be one of your best learning days. Conversely, when you are conquering every challenge laid before you, you may not be having such a great skill-improvement day after all. By nature, we tend to be almost totally subjective about ourselves. That is quite natural; after all, you are you and I am me. We are with ourselves all our lives. Even looking in a mirror, it is difficult, if not impossible, to be objective about certain things in our personal makeup.

Condition One might be cause for disappointment or discouragement. And rightfully so, especially if you haven't completely mastered commitment, discipline and determination. You might think, "I'll never get this," or "Oh boy, another bad day." Usually it's just a fantasy. What you know about yourself is almost entirely subjective. You probably cannot see what an instructor would see. Those "tough" sessions are usually "burning-in" data to your permanent skill memory. A little bit of a struggle generally underlines the goal. Things studied in a casual or cavalier way usually don't adhere very well, if at all. The fantasy is probably just that: a fantasy. Probably, the reality is the reverse of what you think it is . . . your bad day was actually a good day.

Condition Two is very different. That is not to say that a good session is really not a good learning experience. On the contrary, a good session is a good session. But there are two kinds of CONDITION TWO. The good kind is when you learn in an extremely ideal environment. That means that you were extra receptive to the new material, felt especially relaxed and eager to study. Maybe you wanted to continue to another lesson. The not-so-good kind is when you just sort of glided through the session or very methodically and mindlessly, sat down to a session, listened, copied, checked the copy and then put things away. This, too, is a fantasy; you thought you did well, when, in fact, you may not have learned anything. Do not confuse the two. Both will have you leaving the lesson session feeling good about your efforts. Learn to recognize the differences between wanting to do a session and just being there.

WE LEARN FROM THE PAST

You should never lose sight of how far you have come. Think about what you learned today. Think about what you didn't know yesterday. Think about your skill level early in the program. Remember when you didn't know any code at all. Always save your copy sheets (see "STUDYING AND PRACTICE HINTS," #4). If you are upgrading, what do you think is your fastest, good copy code speed? Remember when five WPM was a struggle?

There is never a bad time to analyze your thoughts and feelings about what you are doing, what you want to do and where you are headed. You should live those three words; commitment, discipline and determination. Don't let them become stale in your mind. Try to recall the feelings you had when you first read about them at the beginning of this book. Refresh yourself if you begin to feel the weight of learning; reread any portion of this book that might apply to your present situation. Above all, remember that you have made progress. If you think that you have not advanced as fast as you should have, forget it; you really have. When you have learned from the past, you won't be doomed to repeat it. No one can take away what you have already learned. As long as you are making progress, you will always have a base line to refer to. That reference is the past.

Inspire Yourself

Observe other Hams. Take some mental "snap shots." Combine all of them. What are they doing? Who are they? Where do they come from? Answering those questions will keep you going for as long as there is Ham radio. The answers are simple; everything, everybody, everywhere. Are you one of them yet? How bad do you want to be part of the whole picture? How strong is your desire to advance to the front of this picture? Look at the guy sending television pictures over the Ham bands. How about the other folks working half a dozen different kinds of digital modes; packet, RTTY, PACTOR, AMTOR, facsimile and yes, Morse Code. There's some people making DX contacts through the satellites. And a couple of kids bouncing radio signals off the moon! There are traffic handlers passing important messages. Look at the "emergency" boys and girls involved in ARES and RACES. See the Hams working with the military, participating in a MARS drill. Sure is a crowded picture. There's more, but they are in the background. They are the ones designing antennas and circuits, doing paperwork, administering over test sessions, sorting incoming and outgoing QSL cards, signing award certificates, verifying contest results, holding classes, interfacing with the FCC, Red Cross and local government agencies, writing technical articles for magazines and there's at least one composing a book on Morse Code instruction.

Yes, it's really a crowded picture. These people are all there because they want to be. They are doing exactly what they want to do. They are doing things like saving and protecting lives and property. They are pushing technology to the edge every day. They are maintaining, monitoring and preserving our precious spectrum. They are getting messages and greetings to those unable to communicate with family and other loved ones. They are not professionals doing a job for money. These are Amateur Radio Operators pursuing their favorite hobby. Because of their title, does that mean that Amateurs are less qualified than Professionals? Not a chance! Since the late 19th Century, Amateurs have been in the front of communications technology and developments. We are called Amateur because we don't accept money for what we do; that is what Professionals do. Remember: for us, Amateur is a noun – not an adjective.

Other Hams

Ask any number of Volunteer Examiners or instructors the best way to learn the code and you will get some very profound and varied answers. Ask several Hams and you will get a full spectrum of opinions. Now you really have a problem. Who is right? Which way is correct? First, ask yourself why did so many people give me so many different answers? Simple. They are opinionated. In this case, that is not a bad quality. Usually, the guidance you get will be based on what worked for the particular individual who is giving the advice. If he (or she) learned by copying ARRL bulletins and on-air QSO's at speeds not less than 18 WPM, then, to that person, that's what works! Still, if someone else learned at a local Amateur Radio Club's class and supplemented the lessons with audio tapes or a computer program, then that's the best way because it worked for him.

But, is any of this going to help you? Yes it will. Just give it some careful thought. You can learn quite a bit about yourself, other people and human nature in general by doing this simple exercise. It will also be fun.

Before beginning, you should understand that you will meet three basic types of people: those that are similar to you in a general sort of way, those whom you admire and respect for their achievements and those who are completely the opposite of your individual makeup. We will primarily concern ourselves with the first two types. The individual with opposite or such very differing thoughts, temperament and

personality will not be of value to you in this exercise except for what you might learn from observation and establishing a base-of-reference. It has been said that "opposites attract." That saying might be true in something more intimate than a social relationship because of the balancing effects it may have on the association. But it has little to offer us here. Of all the people you talked to, which of them seems to be most like you? Not who you admire and aspire to be like, but rather who seems to have the same kinds of character traits and qualities that you have. It shouldn't be too difficult to find someone that you can really relate to. Even though we are all different and there are dozens of different personality types within the basic three, you will (or at least, should) be instinctively drawn toward a very similar individual.

Another interesting thing should happen; as we mentioned above, you should also be instinctively drawn toward a person you think you aspire to be like. This part of the exercise may be a little perplexing to you at first. You may feel that this particular individual is very much like you, yet, at the same time admire the person for his or her achievements. You might think that you have really confused the whole exercise. Guess again. Many times when a student befriends someone, without consciously realizing the basic personality similarities, he has subconsciously been drawn to someone he thinks he wants to be like. Let's keep it in context; that is to say, not copy his or her personality, but rather seek the same goals or rise to a similar position. He may not at all be aware of it but he feels it is him in the future. The student should recognize our little scenario and put it to good use. You have seen the future. The person in the future is very much like you. With a little effort it will be you.

Look around you at the local club meetings and test sessions; listen to the repeater and area HF nets; get to know how much Ham activity there is in your neighborhood. It may surprise you. If you are already licensed, you probably already know about most, if not all, of the activity in your area. Licensed or not, get active. Visit, meet, and talk with people; join the conversations and if possible, the activities; insert yourself into the Ham community. Here is where you will find the people we just talked about. Try to look and listen more than you talk. If you have a question about something, take a moment to decide who you are going to ask about it. Then ask. But be advised; when you ask a Ham a question, especially about getting your ticket (license) or upgrading, you are most likely going to get more information than you can absorb in one session. That's alright; take notes. Go out of your way to talk to Hams with higher class licenses. Talk to VE's and instructors. Ask them how long it took them to get from where you are to where they are. Ask if they experienced any particular problems with the code or with their theory instruction. See if anyone has a clever way to memorize the allowable frequencies of the bands you are going to be using. If you are experiencing a certain problem, ask for suggestions. If you have hit a spot in your studies that is giving you some troubles, have someone explain it. Every club has its experts on satellites, packet, ATV, code, antennas, etc. Meet and talk to these people. You can't know everything about everything. Ask a question about something. If you don't have a particular question or can't think of one at the moment, make one up. People love to teach. It is human nature to share knowledge. Hams can get long-winded; as I said before, asking one question can get you more than you expected. We are in the business of Communication. Be polite; listen, talk and socialize. Do twice as much listening as talking; remember, you have two ears and only one mouth! Have you met the person who is very much like you yet? Have you met the person that you are going to be in the near future yet? You will. Just keep shaking hands, meeting, listening and talking. You really will.

How Fast Can You Talk?

Did you know that a good operator can copy code at the same speed as the spoken word in casual conversation? Add to that the abbreviations and other shortcuts telegraphers use and you can increase that another 50%. When you sit before the key talking to someone thousands of miles away you don't have to concern yourself with the usual, various inflections, amenities, gestures and body language that you would have to utilize in order to be comfortable if that same person was there in the room with you. Talking through a key, you don't have to pause to breathe. How fast do people talk? Casual conversation generally begins at about 30 to 50 WPM. The actual rate is usually 100 to 150 WPM or faster, but the speaker must pause to breathe, gesture and think. A fast speaker will rip along at 150 to almost 200 WPM; but not for long. Of course there are different kinds of conversation; the extremes might be elevator talking vs. the long-lost-friend vocal exchange. The total word count really depends less on the speed or word rate for each burst of speech and more on the pauses and ponderings of the speaker; the total, long-term content of the conversation. Let's consider the casual conversation flowing along at a rate of 50 words per minute. That's the pace of a calm, normal conversation. "Now. . . uh within um . . . this . . . uh . . . particular ummm . . . uh 'ya know (breathe in, hold, breathe out) aaaaa . . . type of . . . uh conversation . . . um . . . there uh . . . is um . . . several places (breathe in, hold, breathe out) uh that the uh . . . speaker pauses. . . or uh, 'ya know, um, kind'a uh sticks in uh sounds. . . that really uh . . . um don't uh have anything to do with (breathe in, hold, breathe out) oh, 'ya know uh the conversation." I exaggerate? Maybe, maybe not. Let's take these ramblings of casual, conversational English and condense them into the body of a CW QSO. Depending on the speaker's breathing rate, gesture time, facial expression time, pause and ponder time, foot shuffling time, etc., we clearly have a shot at reducing his recital to 50% or even 33% of its original time. True, the talker doesn't have to say the words "period," "comma," "question mark" and you can speak the number 234,000 faster than most code op's can telegraph it; but all that really pales in the face of um, uh, breathe in, etc. Besides, we can abbreviate many words and phrases: 73, TKS or TNX, R, QSL, QSY, QRT, QRM, QRN, 88, etc. Typically, a Morse Code operator capable of good copy at 15 WPM could have transmitted or received the same information in the same amount of time it took to um, uh, speak it.

Why This Course?

Since the mid-1840's there have been, literally, thousands of variously named code courses. Some of them have been formal courses where the student had to attend classes, or received on-the-job training, some were correspondence courses and some were published in books while others were printed in hobby and technical magazines. Upon investigation, one will find, that when boiled down, there will appear several commonalities amongst most of them. One glaring similarity is the way the student is treated like a computer; like a digital-receiving device. See; "HOW WE USED TO STUDY." Still others are absurd, gimmicked, something-for-nothing, miracle shortcuts that do nothing but cause depression, disappointment and discouragement. Upon further investigation, it becomes quite apparent that there are really only about a dozen or so that have any significant differences in them. And only a few of these treat the student like a real human being – in analog fashion. Usually all of the permutations center around a basic theme, but because there are so many variables, factors and opinions, we end up with such a great variety of code study courses. The usual opening statement in any of these programs generally eludes to the fact that this is the best one, this is the one that works, this is the easiest and this is the fastest; all with the attendant testimonials from successful students. Well, think about it. If you were a super high-speed professional telegrapher, the way you learned is probably the "best" way; no matter how long it took you or how much effort it required. Remember, when the pain is removed, it's hard to remember how much it hurt! Naturally, these

various methods of instruction are based on those authors' best intentions. It might be because a particular way of studying was what the instructor found to be the most efficient for him when he was learning code. Or, it may be because he tried to logically think-it-out and come up with what he perceived to be a very methodical approach. Whatever the case, there remains a variable which almost shatters the logic, analysis, objectivity and methodology; that variable is the fact that people are different. We all live, act, think and learn differently. Some of us learn academic subjects as easily as reading a book, but have some problems with new skills. Yet, others acquire skills by second nature, and have some difficulties grasping and understanding academic subjects. Still, many, many other individuals are a varied mix of both conditions. If we were to really sort out all the very specific variances and details, we would find that there are as many teaching methods and techniques as there are instructors. In the end, they all seem to work. Some because they are good methods and some in spite of the method and only because the student wants to learn. If the teaching technique is very inappropriate, the student may become confused about certain aspects of the program, it may take longer to achieve the goal and it might even be discouraging; but usually the student who wants to succeed will succeed despite an unsuitable program or instructor.

This is one of those subjects upon which we enter into conversation with the same genteel trepidation as politics and religion; for as sure as there is dawn, there will be gunsmoke. Many of our present students have previously studied a variety of courses under an equal variety of instructors, all with specific and definite philosophies concerning proper teaching methodology. As I said above, these are some of our present students. They are students again (or still) because something went wrong and the instructor didn't recognize the problem for what it was or just didn't recognize it at all. Maybe he was aware that something was wrong but couldn't fix it because the problem was not defined in the program outline. Maybe he never experienced a student problem of this particular nature and didn't know how to approach and correct it. Possibly he assessed the problem as lack of interest on the part of the student. Whatever the case, the student persevered and registered with (yet) another course. We have spent considerable time studying many of these stumbling blocks which, at first, appeared to be learning problems, but ultimately proved to be teaching problems, shortcomings within the program or lack of wisdom and methodology from the instructor. The programmed lesson course in this manual has yielded the greatest numbers of successful code students when compared to others we have tried. It must be understood and accepted that the code is a language. Further, it must be taught in a way appropriate to that end: learning a language. I would estimate that about 90% of all difficulties associated with the actual code course have their roots in the way (and order) in which the code characters are presented. After analyzing the learning difficulties of many of our code students, it became quite apparent in this business of subjective learning (acquiring a skill) that studying the "close-sound" and "opposite-sound" characters must be done in close relationship for the very same reasons some of the "modern" instructors separate them into non-related lessons: the initial difficulty in hearing the subtle differences. The EISH5, TMO0(Zero), AN, UGDW, etc. system has been carefully thought-out in order to emulate the process of learning a new language. Which this is! Some modern teaching thought is based on the principle that the student can be, at first, easily confused. We, too, are very aware of the confusion caused by some of these sounds. When, for example, a student hears "S" and "H" as the same letter, it becomes paramount that he or she learns to distinguish the two sounds "up front," regardless of the operating speed. Should the two letters be presented in two different sessions – say, four or five lessons apart – the characteristic sound of the first letter will not be available for the student to compare to the second; all relativity is lost.

This spreading out of sound-alike characters will seem like an easier approach at first, but actually, in our experience, invites potential future problems: slows progress, causes confusion and frustration and tends to encourage "counting," a very bad habit and one which is hard to break. Although it may seem a little more

difficult to learn these sounds at the beginning of the course, once they are absorbed the student can move along quickly going about the business of learning the code and not counting dots and dashes. When learning a new spoken language, the student works with the instructor to pronounce and hear the sounds correctly; subjectivity . . . learning a skill. The instructor will teach in a methodical fashion, concentrating on many "sound-alike" words. *Verbs are always conjugated as a family, never separated into different lessons.* To separate these similar sounds would be to do a terrible disservice to the student by removing the subtle characteristic differences. Likewise, in our course, the code characters are presented in their "conjugated" form (as-it-were) in order to maintain the integrity of relationship and continuity of the various character sounds.

Why You Should Not Upgrade

Amongst the many informal polls we have taken, one of the most interesting was concerned with the reasons why a particular individual didn't pursue the next upgrade. I was convinced to include them here after something amazing happened; upon showing them to some of our students, almost to a person, every student found him (or her) self in at least one of these categories. A good laugh was had by all, who in retrospect, realized their illogical, absurd and sometimes silly rationalizations.

My on-the-spot replies are given in parentheses and I have taken the liberty of adding my comments about their statements.

REASONS FOR NOT UPGRADING
(arranged by category of reply)

"The Code is too hard." *("Did you try it?")*

"It's just too difficult." *("Did you try it?")*

These are typical defeatist attitudes. Remember way back in the beginning under "COMMITMENT" where we said, "Once you commit to do it, you are half way there"? Perhaps these folks just heard the unfamiliar sounds of the code beeping away or looked at a code chart and were scared off. Remember under "DISCIPLINE" we said, "If I try, I can do it"? They just weren't giving themselves enough credit. And I told them so. You just have to be fair to yourself.

"I forgot the code. . . too much to relearn it." *("Did you try?")*

"I learned the code once. . . not going to do it again." *("Did you try?")*

These are the secondary defeatists. They probably started off the wrong way, made some progress anyhow, but had a bitter taste for the whole affair and were looking for a way out from the very beginning. I generally challenge those kinds of statements by telling the person that they have been the victim of poor guidance. If I can get them into the clutches of a code class, we start from the beginning – the right way.

"I will never get the theory." *("Did you try?")*
"That book is real thick." *("Did you try reading it?")*
"I'm not an engineer." *("But, have you tried?")*

I'm not pushing theory in this book; but, do you see a common theme here?

"I don't have the time." *("Did you try to find the time?")*
"My day is full." *("Have you tried to fit it in?")*
"I've got three kids, a house and husband to take care of." *("In that order? Did you ever try to fit-in 15 minutes a day?")*
"I've got time to work, sleep and that's it." *("Do you have 15 or 20 minutes a day to yourself?")*

Schedules seem to always be a problem, or so many people think. Remember, all that is really needed, in terms of time, is a few minutes a few times a day. Many busy people find the time early in the morning, before work, during lunch, as soon as they get home, after dinner and before bed. If you can't find the time, you will just have to make the time.

"I have no desire." *("Well, I'm here if you ever want to try.")*
"I'm lazy." *("So am I; want to give it a try anyhow?")*
"I guess I'm just too lazy." *("Ditto.")*
"I don't know. . . maybe I'm just lazy." *("Ditto, ditto.")*

I'm not sure what lazy means here. I suppose it is their way of saying that they don't really care enough, have some measure of self-doubt or are afraid of trying. If someone doesn't care or has no incentive, then there isn't much I can do for them except to try and make all this look attractive and exciting. If they have doubts about themselves, we can usually boost their confidence by explaining to them how they are no different than anyone else. We then try to get them to the first session to demonstrate how smart they really are. If it looks like they are afraid of trying, generally that means that they are afraid of failing. Usually, the fear of being afraid is worse than actually being frightened. We don't worry about that; this course won't let you become frightened.

"I keep putting it off." *("And you haven't tried yet?")*
"It was one of last year's resolutions." *("And you didn't try it yet?")*
"I promised myself, but. . ." *("And you mean you have not tried yet?")*

Procrastination is a big word. Sometimes it is a big obstacle to get past. I won't dwell on this. Take the first step, that's half the job; the rest will follow. It's that simple.

"I really have bad study habits. I just can't learn." *("Have you tried?")*
"I've tried; believe me." *("Really; have you really tried?")*
"Can't do it." *("We'll help you try.")*
"I don't learn well." *("You should try with us.")*
"Sometimes I think I'm pretty stupid." *("Well, that's the stupidest thing I ever heard. We'll show you how far from the truth that is. Give us a try.")*

I'm always amazed at how many people belittle themselves. From what I can make of it, it seems to be a measure of their frustration level. They feel that if they don't live up to their own expectations, then, they must be stupid. They are their own worst critic. And yes, I must say it again; they cannot be objective about themselves. They have complicated a simple matter. They are too close to the problem and need outside guidance. I have always said that because I'm self employed, I have the worst boss ever; it's the same thing. Unfortunately, this is a very easy hole to fall into. Many people set their goals too high or too close and

even if they don't call themselves stupid, they feel as though there is some shortcoming on their part. They have no other boss; someone who can be objective about their qualities. Please, at this point, seek help from some Ham or club. You'll return home with some peace of mind and a much happier person.

"I took my General five times and still can't pass." *("You tried too hard. You pushed too much. You weren't ready.")*
"I'll never get my license." *("Don't try to go too fast.")*
"I just can't seem to pass that Extra code." *("Don't try to push it. When you're ready for the test, you'll pass.")*

Premature testing is all too common. As a VE, I have never discouraged it. Sometimes it is good for the candidate. He can get an idea of what the test session is all about. He can see first hand that the VE's are friendly, helpful and courteous. He will learn what to do at the session. That usually relieves any anxiety and apprehension for the next time.

Sometimes testing too early is not good. There are those people who thought for sure that they were ready for the exam, but it didn't work out that way. A failed exam in this case can cause discouragement. A little saying we like to use at the test sessions for the benefit of the candidates is, *"There is no such thing as failing a code test; it's just an indication that you are not ready yet."* VE's are generally on the lookout for signs of discouragement. They will try to encourage the candidate if that condition is detected. But remember, VE sessions can be, and often are very busy places. We can be outnumbered ten-to-one or more. It is not always possible to recognize disappointment; even when the meeting place isn't busy. Some people can hide their depression and self-doubt very well. That is why it is important to understand everything in this book. It is even more important to know that there is more help and encouragement out there than you could ever need. If you need reassurance, talk to someone about your troubles. If you need help, ask for it or ask where you can find it. You'll be amazed at the responses.

I suppose by now you get the picture. I can use the word "try" in just about every reply to the responses of our poll. Have you seen yourself or a friend in any of these responses? Do the replies make any sense to you?

The important thing to remember is that for all the reasons that make us different, the same ones make us the same. As individuals we have a different mix of qualities. How we learn, perceive things, analyze problems and deal with adversity are the factors which go into the making of the product; us, the individuals. The mix is different in each and every person, but the basic qualities are there in everyone. If you should ever find yourself on my list of quotes above, sit down and think about, or make a list of your qualities as they apply here. Do you have a sufficient quantity of the required qualities? If the answer is "yes," great, keep going. If the answer is "no, something's wrong," contact an experienced Ham or someone who can get you to a club. At a club where you are pretty much a stranger, ask someone if one of the VE's is there. If not, ask for an experienced code operator or instructor. As I said above, you'll get more help and advice than you can handle. Chances are, all that you really need is a little encouragement; a good old-fashioned shove, someone to push you over that line.

Part VI: The Ham Community

Will The Code Requirement Go Away?

Not likely; at least for quite some time. There are a number of individuals and small, independent groups lobbying to either have the code requirement removed from license testing, or at least have the qualifying speed reduced. These individuals and groups are a small, vocal minority. The fact is that the "silent majority" of the Ham community prefers to retain the requirement, *as is*!

Let's examine both sides of this issue and develop the "total picture":

The opponents to the existing code requirements can be heard expounding some or all of the following: We'll take this one statement at a time:

1. "The code is an old, outmoded and obsolete form of communication. It was the earliest form of digital communication; replaced by powerful, modern "state-of-the-art" modes such as RTTY, Packet, AMTOR, PACTOR, etc. It is inefficient and just not necessary today.

Yes, if ultra-fast information exchange is what you need, then the code is obsolete. In the time it takes for one, short, rag chew QSO, thousands of words can be transmitted by some other digital mode. Packet, RTTY and the others are very exciting facets of this hobby. There are limitless possibilities with these "super modes," especially with today's equipment and satellites. And the technology is growing exponentially.

But, we already have a "No-Code" license class for use on VHF and UHF bands. That's where most of these data transmissions occur and that's where they are most efficient. so, why the concern to abolish Morse Code on HF?

Code transmission – primarily in the form of CW (continuous wave) – is, beyond comparison, the most reliable form of communication. Other modes have been tried and used with varying effectiveness and acceptance. But still, it's the CW that makes the greatest trip with the least power. In reality, CW has a 16-20 dB advantage over common voice modes and a much-greater advantage over some of the electronic digital modes. This is particularly true when interference, either QRN (atmospherics) or QRM (other stations or "man-made" electrical noise) is higher than normal. Think about the advantage. Twenty decibels on the "S" meter is equal to more than three "S units." That kind of signal increase is equal to a station with about 100 times the power output for the same "S" meter reading! To put it another way: to barely hear a station with a given signal strength in voice mode would be equal to the same station running CW at 100 times less power. Add to that, the psychoacoustic effect of being able to hear and copy those tiny little beeps of the code down below the prevailing noise level where speech communication would be impossible. Under some of the worst of conditions, the sequential, well-defined patterns of code beeps can be deciphered into their appropriate letters and numbers when the spoken word would be confusing, at best, but more likely, unintelligible. Code transmissions in general have an intelligibility advantage over all other modes. In that regard, it is the most efficient form of radio communications we have. Fast? Well, suffice it to say that an accomplished operator can communicate in Morse at the same speed as casually spoken English. So much for the power and efficiency of Morse Code transmissions.

2. It is foolish to "force" people to learn this difficult skill. Besides, many Hams don't care for it and once they have passed their tests don't use it again.

Yes, it is a tradition. It is a great piece of our Amateur Radio heritage. We should be proud of it. As far as a Standard, well, nobody is forcing anyone. Even opponents of the code have found it to be fun after giving it a chance. Of course, if someone has the "desire" to work CW, then the word "force" just doesn't apply. Many people find radiotelegraphy fun, exciting, relaxing, rewarding and gratifying. There is a sense of accomplishment when communicating in this way. It is the most personal form of digital communications; through the hand key. Learning Morse Code is not difficult. Actually, it is easier to learn the code than many other skills; everyone has a more-or-less equal opportunity. It is certainly more than fair to ask someone to learn this skill than one that might be very dependent on genetic inheritance such as sculpture or painting which probably would be all but impossible.

3. The only reason we have the code requirement is because of tradition; it's a Ham radio heritage, an old standard that the bureaucrats, as usual, are too slow to evaluate and take action upon in these modern times.

True and not true. The definitive words here are "tradition" and "standard." Everything we do of any value is based on some kind of standard. Laws, religion, education, the economy, and yes, even politics are based on standards suitable to the situations, conditions and circumstances. From sports, the Olympics and contests of any kind, to art, music and the way we dress, standards of some kind are always present. No, we don't have to like them. No, we don't have to agree with them. But they are always there. As citizens, we have the privilege to try to change the ones we think are unfair. What about Amateur Radio? Does all this business about standards have anything to do with Morse Code? You bet it does! There are five "code-required" license classes in the United States at present. Three of these classes require that you demonstrate a minimum prescribed proficiency with the code and two require that you have already done so. These proficiency levels are the standards. *It is these standards that separate those who are determined to achieve a goal and those who lack the commitment and seek a gift.* Nothing good comes without work. It is our efforts in everyday life that determines our successes. It takes commitment, discipline and determination. It also takes some effort. Sociologists, psychologists and philosophers might explain it like this:

"We guard, protect, and defend the things we have gained through our personal efforts in order to maintain the STANDARD for which we have worked so hard to achieve." Or, to paraphrase a little 12-year-old girl student who attended one of my classes: "If you earned it, you'll take care of it, especially if someone else tries to steal it. And if it was given to you for free, you probably won't care what happens to it." Smart kid.

4. There are a lot of good technical people out there who would otherwise be active Hams, contributing their special forms of expertise to the hobby, but are not because of the archaic barrier called the code requirement.

Yes, there sure are a lot of very smart people out there when it comes to being right on the cutting edge of all this communications high technology. There are also a lot of talented people out there when it comes to the building trades, auto mechanics and mechanical engineering. So what. In this paragraph, the operative word is "fair." Wouldn't Ham radio be the leader in just about every communication field if all the genius technicians and engineers were licensed and active Amateurs? Sure. But that's not the goal because it's unrealistic. What is realistic is to bring as many "interested" people into Amateur radio as possible. What happens if we relax or abolish the code requirement? Clearly, the people who have an electronics technical background will have a distinct advantage. An electronics education, no matter how basic, is very desirable when studying for the written portion of a license exam. That might become very apparent the first time the text mentions "reactance" or "impedance" to an insurance salesman or a baker. Remember, the Morse Code is a skill. It has nothing to do with the kind of education you have had or are going to have. It is a skill that says a lot about the person who learns it. It says that the individual is serious about becoming a Ham. It says

that the person is willing to do some work for a very big reward. And most important of all, it says that there exists dedication in the form of commitment, discipline and determination. Now, what does all this do for the Ham radio fraternity? For starters, it makes it pretty FAIR to just about everyone. Some people have an advantage with the written exams but almost no one will have a significant advantage with the code test. *To drop the code requirement would be to place discrimination and prejudice into the Amateur Radio fraternity. And we don't want that. . . we want to keep it FAIR!*

(Read the sections: "EQUAL OPPORTUNITY" and "HOW WE THINK")

Which One Are You?

This information is presented here to give you an overall picture of the Amateur Radio community in general and some recent trends in our Ham population structure. The figures and data are as accurate as current conditions and sources allow. Large numbers and percentages are rounded off.

Thousands of U.S. Amateur Radio operators by license class and year.

	EXTRA	ADV	GEN	TECH	NOVICE	TOTAL
1982						
TOTALS	31.5	94.6	119.7	75.7	88.8	410.3
PERCENT	7.7	23.1	29.2	18.4	21.6	100
1990 (last full year before codeless technician)						
TOTALS	53.8	105.3	119.8	127.4	93.9	500.2
PERCENT	10.7	21.1	23.9	25.5	18.8	100
1991 (codeless technician begins before midyear)						
TOTALS	57.5	107.6	122.6	158.0	97.4	543.1
PERCENT	10.6	19.8	22.6	29.1	17.9	100
1993 (the no-code program approx. 2½ years old)						
TOTALS	65.5	112.8	129	227.7	103	638
PERCENT	10.3	17.7	20.2	35.7	16.1	100

As of this printing, separate figures on Technician with HF and Codeless Technician were unavailable. Let's pull out some data from the chart so that we can understand some of the more interesting points.

Facts

- The most obvious is the growth of the No-Code license class. Prior to this addition to the licensing structure, Technicians averaged from one-fifth to one-quarter of the census; they presently represent more than one-third of the entire U.S. Ham population.
- The General and Novice class have seen a significant decline in numbers.
- The Advanced class has pretty much held its own hovering around one-fifth or about 20% of all Hams.
- Historically, the Extra class has generally represented about one-tenth of the Amateur Radio population; it still does.
- The chart shows us a 55% growth for the U.S. Ham community.

Observations

- Even though the chart does not show the breakdown between Tech w/HF and No-Code Tech, one can easily observe the imbalance by extracting approximate data and comparing the Novice upgrade to General class figures.
- We can see a very significant decline in Novice and General class operators.
- The only license class to show growth is Technician.
- Tech Class figures indicate a very disproportionate increase.
- While Extra seems to be "rock bound"; Advanced has slipped very slightly.

Conclusions

- Before No-Code there was a steady flow of upgrades from Novice to Technician to General. This is not readily apparent in this chart. You would have to examine, for example, the percentages of Novices in a particular year against the percentage of Technicians in the following year prior to the No-Code class. This can also be done for Technician to General. Obviously, Techs and Generals had to come from somewhere; before 1991 there was no "instant" Technician. Unless the student took both Novice and Technician tests within the same year, the figures would represent the license class growth in a fairly linear manner.

- To become a Ham "with code," an individual would have to enter Amateur radio by one of two ways: Novice, then upgrade to Tech w/HF, etc. or No-Code Tech, then upgrade to Tech w/HF. By the numbers presented, it would seem quite apparent that very little upgrading is being done in this area. This tells us that many people are entering Ham radio through the Codeless Technician class and not upgrading at the same rate as Tech w/HF did in the past; it would seem that the Codeless Technicians get stuck there.

- When compared to the five license classes, the General class (which used to be the "heart" of Ham radio), about one-third of the Ham population, with a percentage of almost 7% higher than any other class, is now at the average ratio level of about 20% or one-fifth of all licenses.

- General class used to be the class to achieve for "all-band" operation. In the past, it represented 11% more Hams than did Technician class. General is presently 15.5% lower in numbers than Technician. This is a net loss of 26.5%.

- Advanced class: interestingly enough, these numbers show an accurate, proportional reflection of the down-sliding General class. Obviously, with less Generals to upgrade, there will be less Advanced upgraded Hams.

- Extra class seems to remain fairly consistent. One reason might be the code requirement. The 20 WPM necessary to achieve this license may well be the isolation factor which keeps the unbalanced numbers in the areas of General, Tech, and Novice.

- The General, Advanced and Extra classes do not enjoy their share of the influx of new Amateurs. It would appear that the code requirements for General and Extra have a significant contribution to this fact.

One must, therefore, ask the questions:

Are the majority of all the new No-Code licensees really interested in Amateur radio?

If most of the Codeless Technicians are serious about Ham radio, why isn't that reflected in upgrades in the General class figures?

Have the Technician class numbers increased so dramatically because it is so easy to obtain a No-Code Amateur license?

I don't have all the answers and this is not the place for that kind of discussion or debate. However, all of this is significant food for thought.

The thing to remember here is that dedication and effort are rewarded in Amateur Radio. As the licensing structure presently exists; we have managed to keep the whole system quite fair and free of discrimination and prejudice. That fact is reflected in the privileges attendant to the six license classes and the amount of dedication and effort required to achieve them. Or, simply put, the more serious you are about advancement, the harder you are willing to work; then, the greater your rewards, the greater your privileges and the better you should feel about yourself.

If you were not a Novice yesterday and you are today; congratulations. If you were a Technician yesterday and are a General today; congratulations.

Your dedication and effort will be rewarded; and that is **fair!**

Opinions, Polls and Surveys

On various occasions, we will informally interview some of the students, instructors, volunteer examiners and Hams in general about topics of current interest. One subject frequently surfaces: license class. When asked, "Which class of license do feel is the toughest to attain?" or "What class of operator do you most admire for their achievements and accomplishments?", almost invariably we get the same types of answers from a given class of licensee. Some of the responses may surprise you.

Extra and Advanced class Volunteer Examiners: "Novice" is the answer in about 90% of the replies. Most feel that Novice is the proper way of getting into the hobby. They make that point quite emphatically when asked about students who upgrade to Technician w/HF privileges. I think that the new Codeless Technician class may have had something to do with polarizing some of the Hams who have come-up through the ranks. Some have openly admitted that it was somewhat of a culture shock. Others feel that it was a severe violation of the sanctity of Ham radio. Still others think that it gave a needed boost to the Ham population by virtue of greater accessibility. Regardless of their opinions, their reasons seem to have a common theme; some conjugate paraphrasing would be: "Novices have shown a desire to get into Ham radio." "They learned the rules and regulations, band plans, operating protocols and practices for the bands and they took the time and effort to learn the code." "Boy, have you listened to some of the (2 meter) repeaters lately"? "That's not Ham radio." "It's not a giveaway. Novices wanted it bad enough to work for it and they earned it"!

Well, they may be tough and pointed answers, but if you don't trust our surveys and aren't afraid of poking a stick into a hornet's nest, just ask a group of Advanced or Extra class licensees.

General class operators seem to hold the diplomacy by being split 50/50 between Extra class and Novice. The reasons are pretty predictable. Many "Generals" have gotten enough "taste" of "all-the-bands" and just have to go all the way; that accounts for about half that answered "Extra." The other half just seem to respect the achievement. Many mentioned that they would like to become a VE someday. The half that answered "Novice" pretty much had the same reasons as the Extras and Advanced in the preceding paragraph.

Technician class ops give a pretty good mix of responses with some emphasis on General and Extra. Many desire to continue to upgrade and for some strange reason, many are hesitant to do so. Some freely admit that the 13 WPM code requirement has some significance in their apprehension.

Novice class operators will usually give you one of two answers, without hesitation: "General" or "Extra." These folks are, without comparison, the most enthusiastic group. Some are very methodical in their plans; others are almost euphoric in their exuberance. Whichever the case, the end will justify the means. I always wish them my sincerest "best wishes."

If Ham radio was ever to have a mascot, in the form of a lovable, stuffed animal; this author would name it "Novice"!

What does all this mean to you? Take from it what you will. It becomes quite clear, after talking to many Hams that everyone has his or her own ideas, opinions and philosophies. There is no right and wrong; just personal beliefs designed by the individual for the individual. The commonalities are interesting, to say the least.

Speaking of commonalities, it would be in order to mention a few of the general opinions and observations from the Hams we interviewed. Instead of asking the various class licensees and students "which class of operators do you admire for their accomplishments," we asked these same people what they thought about the various individual classes. It was quite interesting to learn that the common opinions expressed to us represented a majority without regard to the interviewee's license class. This became very apparent early in the research. The following words are from a broad and balanced cross section of the Ham community and are given here as a representation of the general and similar theme of the responses.

Novices:
"They show incentive. That's the most difficult of the two ways to get into this hobby." "I think it's the right way of starting, especially when you compare it to the 'no-code' license. That codeless technician class can become a real trap. A lot of Techs seem to get stuck there and never bother with the code." "I give them credit for going that way to get their ticket." "It's really, the only way to go."

Codeless Technician:
"No-code is okay for some people, I guess, but it seems that a lot of them have trouble getting out of that and into the incentive part of the hobby." "Codeless Tech (class) doesn't tell us that the student has any incentive. I think that 90% of the no-codes are not serious about Ham radio and will never attempt to upgrade." "No-code is okay, but you just got to keep after them, otherwise they'll stay there forever." "I guess it's alright to start that way, but it's going to be tough to make General." "I think many more Novices make General than the No-coders."

Technician w/HF:
"I hear these guys on 10 (meters) and some of these young guys are really smart when it comes to all this hi-tech stuff." "We should call 10 meters the Tech-Plus band." "I hope they upgrade." "Techs were never allowed on HF before." "If they get voice privileges on HF (10 meters) then they are going to get comfortable and never upgrade." "Where's the incentive to go for General if they are allowed to use phone on HF"? "Well, at least they are Hams." "We used to call it, just plain 'Tech'; the test was like General but with 5 (WPM) instead of the 13 (WPM). I think about half of them will go for General."

General:
"That's the big one. That's where you got all the bands. If you can make General, you showed that you're serious about Ham radio." "As far as I'm concerned, that's the top; Advanced and Extra are just icing." "It's hard to get there." "If you're a Novice and get on the air with CW, then General comes real quick." "I'm not going to give up; I'll get there." "The day I passed my General was the biggest day of my life in this business." "It's not over yet; I still have a long way to go to make Extra." "Once you get General, Extra isn't that far away. I've gone this far; I might as well go all the way."

Advanced:
"The toughest test I've ever had. Well, the actual test wasn't bad but that thick book (question pool) was work to get through." "Those guys who know electronics have an advantage. I can do 20 (WPM) but am having a tough time with the theory. It's not fair if you didn't go to school for electronics. I could have been an Extra by now." "This is a tough one, but I'll get there." "They should swap books, you know, Extra for Advanced. Extra would be easy; the code comes with practice, but there are so many questions to make Advanced; I'm not an engineer." "Advanced should have a code requirement." "I'm not going to quit, I'll make it." "When I look back I think the Advanced test was the toughest; but it wasn't that bad." "They are just Generals who know electronic theory; a lot of them never get their 20 (WPM) to make Extra."

Extra:
"Tough job getting here; it was a lot of work." "That's commitment; but anybody can do it." "If I can do it, anyone can." "Easier than I thought." "When I got on the air as a General, the code (speed) just went up to 20 (WPM) with no problem." "The written test was not bad at all." "Some day I'll be an Extra." "I'll get there before I'm 14 (years old)." "When I look back it was a lot of work, but it wasn't that bad." "You should keep preaching perseverance." "The written test was mostly administrative and I really didn't know that I could copy 20 (WPM) already."

"Ham Stories"

The following are typical of the comments received from readers of "HAM STORIES"; a companion book to "THE CODE BOOK: *MORSE CODE INSTRUCTION MANUAL*." "HAM STORIES" is a compilation of inspiring human and personal accounts based on the author's experiences as a Volunteer Examiner and theory and code instructor. The short stories reflect the differences and similarities found in students and test candidates; the apprehension and anxiety of exam night; their troubles, problems and successes. The book "HAM STORIES" is available from the publisher.

(The quotes from letters and telephone calls have been edited for brevity and privacy)

I thought I was different. I thought I had problems because there was something wrong with me. I never realized how much I had in common with other students of the Morse Code. "HAM STORIES" opened my eyes. *(Jon, 29 years old, welder)*

It didn't take long before I found my story in your book. I figured I was the only one who couldn't get past ten words per minute. THE CODE BOOK helped me with my incentive, but "HAM STORIES" really gave me the inspiration. I received my General license last April and now I'm studying for my Advanced. *(Arthur, 42 years old, mechanic)*

I tried and tried, but could never get to the 13 word speed for my General. Time was running out becaus had two months left on my CSCE for the General written exam. I was reading your "HAM STORIES" a realized I was the same as the person in story #3 who was struggling for General speed. I didn't know how common the problem really is; he did it and I did it; thanks. *(Celeste, wife and mother)*

Your book, "HAM STORIES," was like a revelation. I saw myself in two of the stories. That allowed me to analyze my problems and finally get my Extra. *(Tommy, 32 years old, programmer)*

I bought your CODE BOOK first and got my Novice and Technician license, but I couldn't get past eight or nine words per minute for General. I read "HUMPS AND BUMPS" and "MENTAL BLOCKS," but I still had some kind of problem and couldn't figure it out. I bought "HAM STORIES" and realized that I had the same problems as a few of the people in the stories. It was like looking in a mirror. That's how I figured out what had to be done on my part and where to get help. I passed my General last week. *(Gus, 24 Years old, teacher)*

My father is a Ham but I could not learn the code from him because he didn't know the best way to teach it. I listened to him on the air but couldn't get it too good. He bought me your CODE BOOK and I started learning and he helped. I got Novice and Technician Plus but I asked him to buy your Ham Stories because

I couldn't get my General. My father and I read the book and found what I was doing wrong. I passed General two nights ago. Thank you. *(Eddie, 11 years old, sixth-grade student)*

My dad has friends who are Amateur radio operators. He decided to become one. He asked me if I wanted to study with him and I said yes. He bought both of your books about learning the Morse Code and about the Ham stories. We both had some trouble with the code except I think I got it faster than him. He read the "HAM STORIES" and found out how to fix his learning problems. We both passed our Novice last Wednesday and we are going to buy a new radio next week so we have it before the licenses come. *(Debbie, 12 years old, seventh-grade student)*

Thanks, Bob. I passed Advanced two months ago and Extra last week. I now know that it took this long since becoming a General 11 years ago because I just didn't know how to get going again. Your book "HAM STORIES" was the kick I needed to get moving, especially after reading about "Lazy Bob." Thanks again and 73. *(William, 45 years old, machinist)*

Bob, I want to thank you for a very inspiring and easy reading book. I couldn't put "HAM STORIES" down until way past my bed time, (hi). I am 78 years old and a retired Electrical Engineer. I have been a General class for more than 30 years and now, thanks to your book, I'm going to get off my seat and upgrade to Advanced and Extra. My code is OK, but I think I've been pretty lazy so far. That story about the lazy guy must have been written for me, (hi). *(Sam, 78 years old, U.S. Army, Retired)*

Dear Bob; Just curious, are you "Lazy Bob"? Was that your Story? I know it was definitely mine! Thanks for showing me the way! *(Jim, 39 years old, salesman)*

No, Jim; I'm not the Lazy Bob character. I wish my only problem learning the code was being lazy. Unfortunately, I was given some very bad advice on how to learn. . . I think I did just about everything wrong that one could possibly do, (RWB).

I was ready to quit, again. I have tried to get my Novice so many times. They should give me an award for perseverance! I figured that a 42-year-old man with normal intelligence should be able to pass all this stuff without much commotion. Not so for me. I first bought THE CODE BOOK: *MORSE CODE INSTRUCTION MANUAL* and then later "HAM STORIES" seemed like it might be interesting, so I bought that too. That's when I learned (hit me like a ton of bricks) that I was making too much of a project out of it. I really made it a bigger deal than it is. I passed Novice last night and also bought the League's Technician book. Thanks for your insight, Bob. *(Harry, 42 years old, construction)*

I originally thought this was just another money-making code course. I have spent more than $200 on various tapes, computer programs and books from 7 different companies just to learn the code. Some of them are pretty good and some of them are absolutely terrible. Yours is a fresh approach and it worked for me. I got through your first book, THE CODE BOOK, and passed my Novice code test. I am not technical and had some trouble reading the Novice and Technician books for the written test. After reading "HAM STORIES" I found out what was wrong. Actually, two of those stories apply to me; a little lazy and sometimes I think the job is going to be bigger than it really is. Thank you, now I can sell all these tapes and disks to someone else. *(Ben, 33 years old, automotive parts sales)*

Boy, you hit it right on the head. We are not computers! Teaching code to us like we were computers has been going on since the middle of the last century. This is the first time I have ever seen a code course

designed for humans. Your book of "HAM STORIES" not only makes it very clear that we are not machines but also points out some very human solutions to many of the common skill learning difficulties. Thank you for caring. *(Judy, 40ish, academic guidance counsellor)*

Bob, when we first discussed this project, you indicated that you wanted to cover all of the major stumbling blocks that could be encountered by the student. As you may recall, I thought that would be an impossible task. No one, I thought, could document all the possible scenarios. Maybe you don't have all of them yet, I don't know; but I can tell you that between THE CODE BOOK and "HAM STORIES," I'll bet that 99% of the possibilities are there! I suppose your experiences as an Instructor and (Volunteer) Examiner along with the Amateurs you know personally have all contributed to the success of this effort. Kudos. *(Alicia, 30-something, psychologist)*

Thanks for the advanced copy of "HAM STORIES." You were right; one of my basic problems is in there. As you know, I've been an Advanced (class) for several years and just never got around to upgrading. I really want to be a full-fledged VE. After reading the book, especially a couple of the stories which describe me a little, I decided to go for extra. I'm already at about the 18-word speed. I'm doing it for me, but that's a promise to you. Thanks for your help. *(Don, 43 years old, accountant)*

Part VII: Appendices

W1AW Schedule

A.R.R.L.
American Radio Relay League
Newington, Connecticut U.S.A.

Pacific	Mntn.	Cntrl.	East.	Sun	Mon	Tue	Wed	Thu	Fri	Sat
6	7	8	9 am			F	S	F	S	
7	8	9	10 am				B	B	B	B
1	2	3	4 pm	S	F	S	F	S	F	S
2	3	4	5 pm	B	B	B	B	B	B	B
4	5	6	7 pm	F	S	F	S	F	S	F
5	6	7	8 pm	B	B	B	B	B	B	B
7	8	9	10 pm	S	F	S	F	S	F	S
8	9	10	11 pm	B	B	B	B	B	B	B

S = Slow: 5, 7-1/2, 10, 13, 15 WPM
F = Fast: 35, 30, 25, 20, 15, 13, 10 WPM
B = Code Bulletins

Bulletins are sent at 18 WPM

Frequencies: 1.818, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

CW Signals

INTERNATIONAL Q SIGNALS

PARTIAL LIST OF THE MOST COMMON SIGNALS
(For complete list, refer to the A.R.R.L. Operating Manual)

QRA	What is the name of your station?	*The name of my station is . . .*
QRG	What's my exact frequency?	*Your exact frequency is . . .*
QRH	Does my frequency vary?	*Your frequency varies.*
QRI	How is my tone?	*Your tone is . . .*
QRK	What is my signal intelligibility?	*Your signal intelligibility is . . .*
QRL	Are you busy?	*I am busy.*
QRM	Is my transmission being interfered with?	*Your transmission is being interfered with.*
QRN	Are you troubled by static?	*I am troubled by static.*
QRO	Shall I increase transmitter power?	*Increase power.*
QRP	Shall I decrease transmitter power?	*Decrease power.*
QRQ	Shall I send faster?	*Send faster . . . WPM*
QRS	Shall I send slower?	*Send slower . . . WPM*
QRT	Shall I stop sending?	*Stop sending.*
QRU	Have you anything for me?	*I have nothing for you.*
QRV	Are you ready?	*I am ready.*
QRW	Shall I tell . . . you're calling him?	*Please tell . . . I'm calling him.*
QRX	When will you call again?	*I will call you again . . . . hrs*
QRY	What is my turn?	*Your turn is number . . .*
QRZ	Who is calling me?	*You are being called by . . .*
QSA	What is my signal strength?	*Your signal strength is . . .*
QSB	Are my signals fading?	*Your signals are fading.*
QSD	Is my keying defective	*Your keying is defective.*
QSK	Can you work break-in?	*I can work break-in.*
QSL	Can you acknowledge receipt?	*I am acknowledging receipt.*
QSO	Can you communicate with . . . ?	*I can communicate with . . .*
QSP	Will you relay to . . . . . ?	*I will relay to . . .*
QSW	Will you transmit on . . . . . ?	*I will transmit on . . .*
QSX	Will you listen on . . . . . ?	*I will listen on . . .*
QSY	Shall I change frequency?	*I will change frequency.*
QTH	What is your location?	*My location is . . .*
QTR	What is your time?	*My time is . . .*
QTV	Shall I stand guard for you . . .?	*I will stand guard for you.*
QTX	Will you keep your station open?	*I will keep my station open.*
QUA	Have you news of . . . . . ?	*I have news of . . .*

Abbreviations, Prosigns & Prowords

AA ..... All after

AB ..... All before

AR ..... End of message (end of record copy).

AS ..... Stand by; wait.

BK ..... Break; break me; break-in (interrupt transmission on CW).

BT ..... Separation (break) between address and text; between text and signature.

C ..... Correct; yes.

DE ..... From; this is (preceding identification).

HH ..... (Error in sending. Transmission continues with last word correctly sent.)

INT ..... Interrogatory, question

K ..... Go ahead; over; reply expected. (Invitation to transmit.)

N ..... Negative, incorrect; no more. (No more messages to follow.)

R ..... Roger; point. (Received; decimal point.)

SK ..... Out; clear. (end of communications, no reply expected.)

TU ..... Thank you. (or TKX, thanks.)

WA ..... Word after. (used to get fills.)

WB ..... Word before. (used to get fills.)

73 ..... Best regards.

The R-S-T System

READABILITY

1 Unreadable.
2 Barely readable, occasional words distinguishable.
3 Readable with considerable difficulty.
4 Readable with practically no difficulty.
5 Perfectly readable.

SIGNAL STRENGTH

1 Faint signals, barely perceptible
2 Very weak signals.
3 Weak signals.
4 Fair signals.
5 Fairly good signals.
6 Good signals.
7 Moderately strong signals.
8 Strong signals.
9 Extremely strong signals.

TONE

1 Sixty cycle a.c. or less, very rough and broad.
2 Very rough a.c., very harsh and broad.
3 Rough a.c. tone, rectified but not filtered.
4 Rough note, some trace of filtering.
5 Filtered rectified a.c. but strongly ripple-modulated.
6 Filtered tone, definite trace of ripple modulation.
7 Near pure tone, trace of ripple modulation.
8 Near perfect tone, slight trace of modulation.
9 Perfect tone, no trace of ripple or modulation of any kind.

If the signal has the characteristic steadiness of crystal control, add the letter X to the RST report. If there is a chirp, the letter C may be added to so indicate. Similarly for a click, add K. The above reporting system is used on both CW and voice, leaving out the "tone" report on voice.

International Phonetic Alphabet

The following list is for reference only and not usually required for CW work.*

WORD LIST ADOPTED BY THE INTERNATIONAL TELECOMMUNICATION UNION

A	ALFA	N	NOVEMBER
B	BRAVO	O	OSCAR
C	CHARLIE	P	PAPA
D	DELTA	Q	QUEBEC
E	ECHO	R	ROMEO
F	FOXTROT	S	SIERRA
G	GOLF	T	TANGO
H	HOTEL	U	UNIFORM
I	INDIA	V	VICTOR
J	JULIETT	W	WHISKEY
K	KILO	X	X-RAY
L	LIMA	Y	YANKEE
M	MIKE	Z	ZULU

*: Sometimes used for weak signals or when interference is high.

International Time Conversion

UTC	EDT/AST	CDT/EST	MDT/CST	PDT/MST	PST
0000*	2000	1900	1800	1700	1600
0100	2100	2000	1900	1800	1700
0200	2200	2100	2000	1900	1800
0300	2300	2200	2100	2000	1900
0400	0000*	2300	2200	2100	2000
0500	0100	0000*	2300	2200	2100
0600	0200	0100	0000*	2300	2200
0700	0300	0200	0100	0000*	2300
0800	0400	0300	0200	0100	0000*
0900	0500	0400	0300	0200	0100
1000	0600	0500	0400	0300	0200
1100	0700	0600	0500	0400	0300
1200	0800	0700	0600	0500	0400
1300	0900	0800	0700	0600	0500
1400	1000	0900	0800	0700	0600
1500	1100	1000	0900	0800	0700
1600	1200	1100	1000	0900	0800
1700	1300	1200	1100	1000	0900
1800	1400	1300	1200	1100	1000
1900	1500	1400	1300	1200	1100
2000	1600	1500	1400	1300	1200
2100	1700	1600	1500	1400	1300
2200	1800	1700	1600	1500	1400
2300	1900	1800	1700	1600	1500
2400*	2000	1900	1800	1700	1600

Universal Coordinated Time (UTC) is the time at the zero or reference meridian. Time changes one hour with each change of 15 degrees in longitude. The five Time Zones in the U.S. proper and Canada roughly follow these lines.

0000* and 2400 are interchangeable. (2400 is associated with the date of the day ending, 0000 with the day just beginning.)

Amateur Band Frequency Allocations

Where CW Operation Is Allowed (Not Exclusively)*

LICENSE CLASS

Band Meters	Novice	Tech-Plus	General	Advanced	Amateur Extra Class
160	X	X	1.8-2.0	1.8-2.0	1.8-2.0
80	3.675-3.725	3.675-3.725	3.525-3.750 3.850-4.000	3.525-3.750 3.775-4.000	3.500-4.000
40	7.10-7.15	7.10-7.15	7.025-7.150 7.225-7.300	7.025-7.300	7.000-7.300
30	X	X	10.10-10.15	10.10-10.15	10.10-10.15
20	X	X	14.025-14.150 14.225-14.350	14.025-14.150 14.175-14.350	14.00-14.35
17	X	X	18.068-18.168	18.068-18.168	18.068-18.168
15	21.1-21.2	21.1-21.2	21.025-21.200 21.300-21.450	21.025-21.200 21.225-21.450	21.00-21.45
12	X	X	24.890-24.990	24.890-24.990	24.890-24.990
10	28.1-28.5	28.1-28.5	28.0-29.7	28.0-29.7	28.0-29.7
6	X	50.0-54.0	50.0-54.0	50.0-54.0	50.0-54.0
2	X	144.0-148.0	144.0-148.0	144.0-148.0	144.0-148.0
1.25	222.10-223.91	222.0-225.0	222.0-225.0	222.0-225.0	222.0-225.0
.70	X	420.0-450.0	420.0-450.0	420.0-450.0	420.0-450.0
.33	X	902.0-928.0	902.0-928.0	902.0-928.0	902.0-928.0
.23	1270-1295	1240-1300	1240-1300	1240-1300	1240-1300

Note: This chart is intended as a guide only and does not reflect FCC Regulations pertaining to mode, power, location, etc. Refer to "The ARRL Operating Manual" and "The FCC Rule Book" for Rules and Band Planning.

Frequencies are in MHz.

* The second group of frequencies within a band represents the "phone" portion of that band; CW may be used there, although it is not necessarily the usual case.

Letters: Usage in the English Language

The following list shows the frequency of usage for the letters of the alphabet. For convenience, they are tabulated in alphabetical order and by frequency of usage.

Generally speaking, the least-used letters seem to represent most of the so-called problem letters. It can be understood, therefore, that some of these lesser-used letters can be skipped or missed on a code exam without causing too much difficulty when reading back the copy. A missing X, Y or Z, for example, can usually be filled in when the remainder of the letters of a word are present.

LETTERS: General usage in the ENGLISH language

ALPHABETICAL ORDER

Letter	Order
A	3
B	20
C	13
D	10
E	1
F	14
G	18
H	9
I	5
J	23
K	22
L	11
M	15
N	6
O	4
P	16
Q	24
R	8
S	7
T	2
U	12
V	21
W	19
X	25
Y	17
Z	26

USAGE ORDER

Order	Letter
1	E
2	T
3	A
4	O
5	I
6	N
7	S
8	R
9	H
10	D
11	L
12	U
13	C
14	F
15	M
16	P
17	Y
18	G
19	W
20	B
21	V
22	K
23	J
24	Q
25	X
26	Z

The International Morse Code

I purposely did not include a chart of the Morse Code in this Manual. One of the greatest disservices anyone can do themselves is to memorize the code by dots and dashes. All this can lead to is a firmly implanted habit of copying by translation (read "HOW WE USED TO STUDY," page 8). It may get you through the Novice exam, but if you aspire to upgrade, you will have to unlearn that translative method before you can begin to learn the correct, instinctive method. Besides, it will be work – not fun – when you are on-the-air. Since we should learn the code by sounds rather than the element ciphers, and because I have had several requests for some form of reference to the code itself, I am including a chart here.

A	didah
B	dahdididit
C	dahdidahdit
D	dahdidit
E	dit
F	dididahdit
G	dahdahdit
H	didididit
I	didit
J	didahdahdah
K	dahdidah
L	didahdidit
M	dahdah
N	dahdit
O	dahdahdah
P	didahdahdit
Q	dahdahdidah
R	didahdit
S	dididit
T	dah
U	dididah
V	didididah
W	didahdah
X	dahdididah
Y	dahdidahdah
Z	dahdahdidit

1	didahdahdahdah
2	dididahdahdah
3	didididahdah
4	dididididah
5	dididididit
6	dahdidididit
7	dahdahdididit
8	dahdahdahdidit
9	dahdahdahdahdit
0	dahdahdahdahdah

Period	didahdidahdidah
Comma	dahdahdididahdah
Question Mark	dididahdahdidit
AR – "Over"	didahdidahdit
SK – "Clear"	didididahdidah
BT – Pause	dahdidididah
DN – Slant Bar	dahdididahdit

About The Author

Robert (Bob) Betts is an active Ham Radio operator and holds an Amateur Extra Class license, presently N1KPR. He is a member of several organizations: American Radio Relay League (ARRL); Antique Wireless Association (AWA); Morse Telegraph Club (MTC); and the Amateur Radio Emergency Service (ARES). He also belongs to several local clubs: Stratford Amateur Radio Club (SARC), W1ORS; Valley Amateur Radio Association (VARA); Shelton-Huntington Amateur Radio Club (SHARC); Amateur Radio Club of Shelton (ARCS) and participates in several local and DX, scheduled nets on the Ham bands.

Bob is an accredited Volunteer Examiner and has served at test sessions in his area, he also conducts local, ongoing classes in theory and code. He has served as Education Officer, Awards Chairman, and on the Communications Committee at SARC/W1ORS, where he presently presides as President. He is co-founder of SHARC and ARCS. Additionally, he is Control Operator of two local scheduled nets; one a CW "round table" for code practice and the other, an open forum for the discussion of theory for license upgrade candidates. Accordingly, he has created several operational and achievement award programs. Bob has had several articles on keys and telegraphy published in various Ham and Telegraph periodicals; has had promotional Amateur Radio articles published in local newspapers and is a frequent contributor to the various club news letters.

Bob attended several technical schools and an engineering institute. In the U.S. Army, he worked as a communications specialist at a missile guidance and tracking facility and also served as a part-time instructor for the U.S. Army Signal Corps School. Professionally, he has worked for more than 30 years in the field of Electronics Technology and held the positions of Chief Engineer, Acoustics; Director, Electromechanical Products and Vice President, Product Design. He presently owns his own engineering consulting company.

Bob enjoys building Amateur Radio equipment and is an avid telegraph key collector. He owns a modest machine shop which complements the key collecting, restoration and building aspects of his hobby. Many of Bob's restorations and "Home-brews" have been featured in Ham magazines and collectors' journals.

Bob, his wife Maryann and daughter Stacy reside in Shelton, Connecticut. He and his family enjoy numerous outdoor activities.

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